STAFF REPORT
AMENDMENT OF THE WATER QUALITY CONTROL PLAN FOR SACRAMENTO RIVER BASIN, SACRAMENTO - SAN JOAQUIN DELTA BASIN, AND THE SAN JOAQUIN RIVER BASIN

INTRODUCTION

The Water Quality Control Plan (Basin Plan) for the Sacramento River Basin (Basin 5A), Sacramento - San Joaquin Delta (Basin 5B), and the San Joaquin River Basin (Basin 5C) was first adopted in 1975. Triennial reviews were completed in 1984 and 1988. The Basin Plan was revised and updated in 1989. This Basin Plan Amendment fulfills various federal and state requirements, including Federal Clean Water Act Section 303(c)(1) and California Water Code Section 13240.

The Regional Water Board must comply with the requirements of the California Environmental Quality Act ("CEQA," Public Resources Code Section 21000 et seq.) when amending the Basin Plan. CEQA provides that a program of a state regulatory agency is exempt from the requirements for preparing Environmental Impact Reports (EIRs), Negative Declarations, and Initial Studies if certified as functionally equivalent by the Secretary of the Resources Agency. Public Resources Code Section 21080.5. The process the Regional Water Board is using to amend the Basin Plan has received certification from the Resources Agency to be "functionally equivalent" to the CEQA process. Title 14, California Code of Regulations (CCR), Section 15251(g). This staff report is a Functional Equivalent Document (FED) which fulfills the requirements of CEQA.

The purpose of this staff report is to present alternatives and staff recommendations for amending the Basin Plan and to provide a summary of the necessity for the proposed regulatory provisions. The potential for environmental impacts which would occur as a result of the proposed amendments is addressed in the Environmental Checklist (Appendix 1) and in the discussion of the rationale for why an individual alternative was selected over others. Where applicable, an attainability analysis is presented. All potential environmental impacts are being mitigated to a less than significant level.

A workshop was held on 30 November 1993 to receive public input regarding potential revisions to the Basin Plan. A public hearing is scheduled for December 1994 to receive public comments on this draft FED and proposed amendment of the Basin Plan. The public hearing notice is included as Appendix 2.

The major purposes of the proposed revisions are to update the Basin Plan and to revise the format to make the Basin Plan more useful. The amendments to the Basin Plan include revisions to beneficial uses, water quality objectives and implementation programs.

BACKGROUND

The Basin Plan includes a forward and five chapters. The forward explains the federal and state requirements of the Basin Plan. Chapter I is the introduction and includes a description of the watershed basins and ground waters that are covered under the Basin Plan. Chapter II provides a listing of present and potential beneficial uses of the principle waters in the basins. Chapter III contains water quality objectives that need to be achieved to protect those uses identified in the previous chapter. Chapter IV contains descriptions of programs of implementation for achieving compliance with the water quality objectives. This chapter summarizes and or references State and Regional Water Board policies, plans, guidelines, and programs that influence how compliance with water quality objectives is achieved. Chapter V describes monitoring programs that are implemented to measure compliance with water quality objectives.

The Porter-Cologne Water Quality Control Act ("Porter-Cologne," Water Code Section 13000 et seq.) defines water quality objectives as "...thelimits or levels of water quality constituents or characteristics which are established for the reasonable protection of beneficial uses of water or the prevention of nuisance within a specific area." It also requires the Regional Water Board to establish water quality objectives, while acknowledging that it is possible for water quality to be changed to some degree without unreasonably affecting beneficial uses. Water Code Section 13241. In establishing water quality objectives, the Regional Water Board must consider the following factors:

1. Past, present, and probable future beneficial uses;
2. Environmental characteristics of the hydrographic unit under consideration, including the quality of water available thereto;
3. Water quality conditions that could reasonably be achieved through the coordinated control of all factors which affect water quality in the area;
4. Economic considerations;
5. The need for developing housing within the region; and
6. The need to develop and use recycled water. Water Code Section 13241.

The first four factors are considered in this document. This amendment would not impact the ability to develop housing within the region or to develop and use recycled water.

Water Code Section 13000 mandates that activities and factors which may affect water quality "shall be regulated to attain the highest water quality which is reasonable, considering all demands being made and to be made on those waters and the total values involved, beneficial and detrimental, economic and social, tangible and intangible." Consequently, the Regional Water Board may adopt water quality objectives even though adoption may result in significant economic consequences to the regulated community.

As stated in the existing Basin Plan, the Federal Clean Water Act requires a state to submit for approval of the Administrator of the United States Environmental Protection Agency (USEPA) all new or revised water quality standards which are established for surface and ocean waters. California water quality standards consist of both beneficial uses (identified in Chapter II) and the water quality objectives based on those uses. It is important to note that the Porter-Cologne Act and federal Clean Water Act have differing requirements for how and when economics are to be considered. Under Porter Cologne, economics must be considered when adopting water quality objectives. However, under the Clean Water Act, once beneficial uses have been designated for a water body, criteria to protect those uses (water quality objectives) must at a minimum fully protect those uses, regardless of economic considerations. Above this minimum threshold of protectiveness, economics may be considered in adoption of more restrictive Clean Water Act criteria.

The Porter-Cologne Act also states that Basin Plans must contain a program of implementation for achieving water quality objectives. Water Code Section 13050(j). The implementation program must include at least the following:

1. A description of the nature of actions which are necessary to achieve the objectives, including recommendations for appropriate action by any entity, public or private;
2. A time schedule for the actions to be taken; and
3. A description of surveillance to be undertaken to determine compliance with the objectives. Water Code Section 13242.

EXECUTIVE SUMMARY

Following is a chapter by chapter summary of the proposed changes to the existing Basin Plan. All of the chapters also include editing changes that do not constitute substantive changes, and are therefore not discussed in this staff report. All significant changes will be discussed in more detail under the section titled "Issue Analyses."

Forward

The Forward has been changed to reflect how this amended Basin Plan fits in with previous Basin Plan actions. It also includes a new section that explains that this Basin Plan complements the various statewide plans, such as the Water Quality Control Plans for Bays and Estuaries and Ocean Waters.

Chapter I - Introduction

The Basin Plan covers the area drained by the Sacramento and San Joaquin Rivers. For planning purposes, it was divided into three basins: Sacramento River Basin,

Sacramento - San Joaquin Delta, and San Joaquin River Basin. The revised Basin Plan divides the same area into two basins: Sacramento River Basin and San Joaquin River Basin. This change was made to make the Basin Plan consistent with other agencies' planning boundaries. There is a note describing the existing planning boundary between the San Joaquin River Basin and the Tulare Lake Basin. There is also a brief description of the surface and ground water resources in the two basins. This chapter has been expanded to include more discussion on ground water. Reference is made to Department of Water Resources (DWR) Bulletin 118-80, which is a partial representation of the region's ground water basins. However, in order to be consistent with the State Water Board's interpretation of Water Code Section 13050(e), the proposed Basin Plan defines ground water to include all subsurface waters that occur in fully saturated zones and fractures within soils and other geologic formations, whether or not these waters meet the classic definition of an aquifer or occur within DWR identified ground water basins.

Chapter II - Present and Potential Beneficial Uses

The beneficial uses chapter has been revised to incorporate beneficial use definitions for surface waters that are consistent with other Regional Water Boards, with some minor additions. The revised definitions do not significantly change the meaning of any of the beneficial use designations that exist in the present Basin Plan. (See "Issue Analysis" for more detail.) The water bodies are grouped by hydrologic unit and new maps are provided to make finding water bodies easier.

As discussed above, the proposed third edition of the Basin Plan is divided into two basins, instead of three. Table II-1 has been modified slightly to correspond to the new maps. Hydrologic unit numbers have been added to the table to help the reader locate water bodies on the maps. In addition to the general table modifications, an "existing" municipal and domestic supply (MUN) designation has been added for Cache Creek (Clear Lake to Yolo Bypass). These changes will be explained in more detail later under "Issue Analysis." Potential beneficial uses for "Auburn Reservoir (Under Construction)" were removed from the table because the reservoir is not under construction.

The existing Basin Plan indicates that streams not listed on the surface water beneficial use table (Table II-I) have the same beneficial uses as the listed streams, lakes and reservoirs to which they are tributary. This statement (footnote to Table II-1) has been deleted. New language has been added that indicates that beneficial uses of any specifically identified water body generally apply to its tributary streams, but that in cases where this does not make sense the Regional Water Board will make site-specific determinations. This is discussed in more detail under "Issue Analysis."

Provisions of State Water Board Resolution No. 88-63, "Sources of Drinking Water Policy" have been specifically listed. The ground water beneficial uses table has been

replaced by a narrative description which says that all ground waters in the Sacramento and San Joaquin River Basins (with specific stated exception criteria) are considered suitable or potentially suitable, at a minimum, for MUN, agricultural supply (AGR), industrial service supply (IND), and industrial process supply (PRO). This revision expands the AGR, IND and PRO beneficial uses to more ground water areas. No beneficial uses have been deleted. These changes will be discussed in more detail under "Issue Analysis." The existing ground water map has been deleted, since it is out-of-date.

Chapter III - Water Quality Objectives

This chapter has been revised to incorporate objectives contained in the Statewide Water Quality Control Plan for Salinity in the Delta.

Under the "Chemical Constituents" and "Radioactivity" sections for both surface and ground water, the existing Basin Plan references drinking water standards contained in the California Code of Regulations, Title 22, Division 4, Chapter 15. Reference to drinking water standards contained in Title 40, Code of Federal Regulations, Parts 141 and 143, has been added. This merely adds clarifying language to describe existing requirements under Section 4023.1 (a)(3) of the Health and Safety Code and the Federal Safe Drinking Water Act. (See "Issue Analysis" for more detail.)

Table III-1 has been reorganized for clarity. The table has been organized by constituent. rather than by geographical location. Most of the objectives have not been changed. However, the critical year, monthly mean, selenium objective for the San Joaquin River, mouth of the Merced River to Vernalis [0.008 mg/l (maximum concentration)], and the selenium objectives for Salt Slough, Mud Slough (north), and the San Joaquin River from Sack Dam to the mouth of the Merced River [0.026 mg/l (maximum concentration) and 0.010 mg/l (monthly mean)] were disapproved by USEPA. The new selenium objectives that appear in Table III-1 were promulgated by USEPA on 22 December 1992 following USEPA's disapproval of the Regional Water Board's selenium concentrations. (See 57 Fed. Reg. 60848, 60920.) The new selenium concentrations in Table III-1 are provided solely for reference. The new footnote at the end of the table notes this and makes it clear that these objectives were not adopted by the Regional Water Board.

The "Dissolved Oxygen" section has been reorganized for clarity. The 6.0 mg/l objective for the San Joaquin River (between Turner Cut and Stockton, 1 September through 30 November) was added for the readers' convenience. The objective is in the State Water Board's Water Quality Control Plan for Salinity, May 1991. The objective is more stringent than what is in the Regional Water Board's existing Basin Plan. Pursuant to Water Code Section 13170, the objective contained in the State Water Board plan supersedes the objective contained in the Regional Water Board's Basin Plan.

A sentence has been added to the "pH", "Temperature", and "Turbidity" sections for surface waters. The sentence clarifies how the current objectives in these three sections are implemented. It states that in determining compliance with the water quality objectives, appropriate averaging periods may be applied provided that beneficial uses will be fully protected.

Table III-2, "Specific Dissolved Oxygen Water Quality Objectives", has been revised to remove redundancies and inconsistencies. The revisions do not change any of the objectives.

The existing section on toxicity in surface waters contains a narrative statement and indicates how compliance will be measured. New language has been added that explains how the Regional Water Board considers, on a case-by-case basis, all material and relevant information submitted by the discharger and other interested parties, and relevant numerical criteria and guidelines developed and/or published by other agencies and organizations to determine compliance with the objective. This is discussed in more detail later in this document under "Issue Analysis." A new paragraph has also been added stating that in the absence of scientifically valid data to the contrary, theoretical risks from toxic substances will be considered additive across all media of exposure and will be considered additive for all chemicals having similar toxicological effects or having carcinogenic effects. (See "Issue Analysis" for more detail.)

The turbidity objective for surface waters having a natural turbidity less than 5 NTUs has been changed from "...increases shall not exceed 20 percent" to "...increases shall not exceed 1 NTU." This change is discussed in more detail under "Issue Analysis".

The "Chemical Constituents" section for ground waters in the existing basin plan contains the sentence, "Ground waters designated for use as agricultural supply (AGR) shall not contain concentrations of chemical constituents in amounts that adversely affect such beneficial use." The sentence has been deleted in the proposed Basin Plan since it is redundant. The first sentence under the "Chemical Constituents" heading says the same thing for all beneficial uses, which includes agricultural supply.

In the existing Basin Plan, under the ground water section, there are narrative objectives that simply say ground water shall not contain chemicals in concentrations that adversely affect beneficial uses. A new subsection has been added on toxicity in ground water. The new subsection takes the same approach as the existing Basin Plan contains for toxicity in surface waters. In other words, ground waters must be maintained free of toxicants in amounts that cause detrimental physiological responses in human, animal, or aquatic life associated with the use of the ground water. Compliance with this objective will be measured in the same manner as for surface waters (i.e., reference to available criteria, direct evidence of toxicity, and information submitted by the discharger and other interested persons). There is also a statement, like the one for surface waters,

accounting for additive toxicity of pollutants in ground water. (See "Issue Analysis" for more detail.)

Figure III-2 and Table III-5 have been updated. The figure and table in the existing Basin Plan were from the State Water Board's Delta Plan and Decision 1485 and were provided for the reader's convenience. The Delta Plan has been superseded by the State Water Board's Water Quality Control Plan for Salinity, May 1991. Therefore, the table and figure need to be replaced.

Chapter IV - Implementation

This chapter is divided into five sections. Revisions are discussed section by section.

WATER QUALITY CONCERNS

The introduction to this section has been amended to include a general description of surface and ground water concerns and problems. Subsections have either been added or expanded to discuss urban runoff, mining waste management, hazardous and non-hazardous waste disposal, and contaminated sites.

Under the subsection "Water Bodies with Special Water Quality Problems", language has been added that refers to the policy for establishment of a water quality limited zone for ground water that is analogous to the water quality limited segment concept for surface water. The ground water policy is described under "Control Action Considerations of the Central Valley Regional Water Quality Control Board", "Policies and Plans" section (page IV-22, item 10).

NATURE OF CONTROL ACTIONS IMPLEMENTED BY THE REGIONAL WATER BOARD

This section has been revised to incorporate recently adopted state policies, plans, and programs. New and/or updated summary paragraphs are provided for the following:

1. State Water Board Resolution No. 88-63, Sources of Drinking Water
2. State Water Board Resolution No. 90-67, Pollutant Policy Document
3. State Water Board Resolution No. 92-49, Policies and Procedures for Investigation and Cleanup and Abatement of Discharges Under Water Code Section 13304
4. State Water Board Resolution No. 93-62, Policy for Regulation of Discharges of Municipal Solid Waste
5. Exception to The Thermal Plan
6. Delta Plan, Water Rights Decision 1485, and the Water Quality Control Plan for Salinity
7. Nonpoint Source Management Plan

8. Discharges of Waste to Land, California Code of Regulations Title 23, Division 3, Chapter 15
9. Solid Waste Assessment Test
10. Toxic Pits Cleanup Act
11. Underground Storage Tank Program
12. Aboveground Petroleum Storage Act
13. Storm Water Regulations
14. U.S. Department of Defense Program
15. Memorandum of Agreement between State Water Board and Department of Health Services regarding the implementation of the hazardous waste program
16. Memorandum of Agreement between State Water Board and Department of Health Services regarding the use of reclaimed water.
17. Memorandum of Understanding between State Water Board and Department of Health Services/Department of Toxic Substances Control regarding the roles of each agency for cleanups of hazardous waste sites.
18. Memorandum of Understanding between State Water Board and U.S. Department of Agriculture, Soil Conservation Service regarding implementation of best management practices and other nonpoint source pollution prevention measures
19. Memorandum of Understanding between State Water Board and Air Resources Board and Integrated Waste Management Board to enhance program coordination and reduce duplication of effort
20. Memorandum of Understanding between State Water Board and Department of Pesticide Regulation to ensure that pesticides registered in California are used in a manner that protects water quality and the beneficial uses of water while recognizing the need for pest control
21. Memorandum of Understanding between State Water Board and numerous agencies on Implementation of the San Joaquin Valley Drainage Program (agencies agree to use the management plan described in the September 1990 final report of the San Joaquin Valley Drainage Program as a guide for remedying subsurface drainage and related problems)
22. Memorandum of Understanding between State Water Board and Integrated Waste Management Board to address the Regional Water Board's review of SWAT reports
23. Memorandum of Agreement between the State Water Board and Bureau of Land Management to address nonpoint source water quality issues on public lands managed by the Bureau
24. Regional Water Board Resolution No. 70-118, Delegation of Duties and Powers to the Regional Water Board's Executive Officer
25. Regional Water Board Policy on Reuse of Wastewaters
26. Regional Water Board Policy on Implementation of Antidegradation Policy
27. Regional Water Board Policy on Application of Water Quality Objectives
28. Regional Water Board Policy on Investigation and Cleanup of Contaminated Sites
29. Regional Water Board Policy on Ground Water Water Quality Limited Zone
30. Memorandum of Understanding between the Regional Water Board, California Department of Fish and Game, and Vector Control Districts of the South San

Joaquin Valley which designates the Districts as lead agencies in determining the adequacy of vegetation management operations in abating mosquito breeding sources

The Regional Water Board policies (25-29) are new and are discussed in more detail later under "Issue Analysis." The other twenty-five are paragraphs that describe the provisions of the plans and policies that were previously adopted or approved by the State Water Board or Regional Water Board.

ACTIONS RECOMMENDED FOR IMPLEMENTATION BY OTHER ENTITIES

No substantive revisions have been made to this section.

CONTINUOUS PLANNING FOR IMPLEMENTATION OF WATER QUALITY CONTROL

No substantive changes have been made to this section.

ACTIONS AND SCHEDULE TO ACHIEVE WATER QUALITY OBJECTIVES

Porter-Cologne states that Basin Plans must contain a program of implementation for achieving water quality objectives. Specifically required is a description of the nature of actions which are necessary to achieve water quality objectives, a time schedule for actions to be taken and a description of surveillance to be undertaken to determine compliance with the objectives. Much of the Implementation Chapter (Chapter IV) contains general implementation provisions. The implementation plan is greatly strengthened by including more detail, especially for those situations where water quality objectives are threatened or not being met and where the attainment of those objectives may be difficult or complex. Recognizing this need, in 1987, the Regional Water Board conducted a Triennial Basin Plan Review. As part of that review, the Regional Water Board developed a list of major water quality problems that needed to be addressed. The Regional Water Board prioritized the list and developed workplans to address the problems. The implementation actions, time schedules, and monitoring portions of the workplans were incorporated into the Basin Plan (Chapter IV, Actions and Schedule to Achieve Water Quality Objectives). As pointed out in the existing Basin Plan, implementation of the workplans was dependent on resource availability.

These workplans have been updated to reflect existing conditions, progress on implementation of past proposed actions, and future proposed actions. The updated workplans include the implementation status of the work proposed in 1987 and revised workplan elements and time schedules (where appropriate). These updated workplans will be approved concurrently with the adoption of the updated Basin Plan and will meet the requirements for completing a triennial review. Applicable portions of the workplans

are incorporated into the Basin Plan. There are no new regulatory provisions in these workplans. Some of the workplans call for development of new or revised regulatory approaches and these will be fully evaluated when they are developed. New workplans were developed and summarized for "Dairies" and "Nutrient and Pesticide Discharges from Nurseries."

Following is brief description of the workplans:

Agricultural Drainage Discharges in the San Joaquin River Basin

All the major workplan elements were implemented or are still in the process of being implemented in accordance with time frames contained in the workplan. One element was not implemented. Due to reductions in resources, the Regional Water Board did not prepare a study plan by 1 March 1989 that identified the information needed to reconsider selenium and boron objectives in 1992. The updated workplan indicates that the Regional Water Board will do this in the next three years.

Assessment of Biotoxicity of Major Point and Nonpoint Source Discharges In the Sacramento and San Joaquin River Basins

All the primary actions identified in the 1987 workplan were completed. Reports were written summarizing monitoring results. The Regional Water Board's updated workplan includes continued work in the lower portions of both Rivers and in the Delta.

Acid Mine Drainage from Abandoned Mines in the Sacramento River Basin

All the primary actions identified in the 1987 workplan were completed. Inadequate resources were available for implementation of the augmented actions. The Regional Water Board's updated workplan includes a broadened focus, to address other sources of metals, in addition to the mines. The title of this workplan element is changed to *"Heavy Metals from Point and Nonpoint Sources"* to reflect the broadened scope. At current and projected funding levels, the Regional Water Board plans to continue to monitor in the Delta, develop a mass emission strategy, work to resolve liability issues, and coordinate copper reduction programs with the San Francisco Bay Regional Water Board. With augmented resources, the Regional Water Board would establish a monitoring program to track metals into and across the Delta, update the Abandoned Mine Inventory, and initiate studies to define agricultural sources of copper.

Mercury Discharges in the Sacramento River and San Joaquin River Basins

All the primary actions identified in the workplan were completed. None of the augmented actions were completed because of inadequate resources. The Regional Water Board's updated workplan includes continued monitoring for mercury in the Delta

and at upstream reservoirs. The augmented actions identified in 1987 are still appropriate.

Pesticide Discharges from Nonpoint Sources

In 1987, the focus of this element was rice field discharges. The scope was broadened and the title changed in the 1990 Basin Plan update to reflect this broadened scope. All the primary actions identified in 1987 (in the workplan titled Rice Field Discharges in the Sacramento River Basin) were implemented. The actions identified in the 1990 Basin Plan amendment have been partially implemented. This amendment is now being reevaluated, in response to litigation. Some monitoring is planned in the Delta and downstream portions of the Sacramento and San Joaquin Rivers to determine pesticide levels. With augmented resources, the Regional Water Board proposes to develop studies to more closely link toxicity with observed pesticide levels. In addition, studies would be undertaken to get more information that links elevated pesticide levels with in-stream impairments.

Dredging in the Sacramento River and San Joaquin River Basins

In 1987, the Regional Water Board proposed to produce a set of guidelines for regulation of dredging and riverbank protection projects. This was not done because staff participated in a cooperative effort to develop a long term management strategy for dredging (LTMS). The development of this strategy is still underway. This strategy will accomplish the same results as the guidelines the Regional Water Board was going to develop. The Regional Water Board's updated workplan includes continued work on the LTMS and review of all significant dredging projects that are planned in the Region. Augmented actions would include development of guidelines for assessing the compatibility of dredged material with proposed uses.

Nitrate Pollution of Ground Water in the Sacramento River and San Joaquin River Basins

Due to limited resources available in 1987, no primary actions were proposed. With augmented funding, staff proposed to design and conduct a systematic assessment of nitrate problem areas in the Basins through a contract with the University of California. Inadequate resources were available to implement the augmented actions. Some work was initiated on defining ground water problems in Merced County and in development of guidelines for protecting ground and surface water from dairy discharges. At current and projected levels of funding for the next three years, the Regional Water Board expects to complete the development of dairy waste management guidelines. Augmented resources are needed to assure that adequate support is available for this program.

Temperature and Turbidity Increases Below Large Water Storage and Diversion Projects in the Sacramento Basin

The primary action identified in the 1987 workplan was implemented. Conditions were placed on the discharge from Shasta Dam. No specific actions are proposed for the next triennial review period other than coordinating with other agencies.

Beneficial Use Impairments from Logging, Construction, and Associated Activities

The primary action identified in the 1987 workplan was not implemented. The Regional Water Board did not consider adoption of a Basin Plan prohibition on the discharge from logging of soil, silt, debris, and other material in quantities deleterious to beneficial uses. Instead, staff will continue to participate in weekly interagency review team meetings (in Redding and Fresno) and pre-harvest as well as post-harvest inspections. During the 1994 calendar year, staff expects to review approximately 800 timber harvest plans and attend about 80 pre-harvest inspections and some post-harvest inspections. In addition, watersheds with the potential to be designated special watersheds need to be monitored and assessed. Staff will pursue additional funding in an attempt to meet the increased staffing needs for this task.

Dairies

This is a new workplan element. Future work builds on the results of a recent project that evaluates alternative approaches to obtaining improved water quality at dairy sites.

Nutrient and Pesticide Discharges from Nurseries

This is a new workplan element. Future work builds on the results of a recent project that evaluated discharges from representative nurseries.

ESTIMATED COSTS OF AGRICULTURAL WATER QUALITY CONTROL PROGRAMS AND POTENTIAL SOURCES OF FINANCING

No substantive revisions were made to this section.

Chapter V - Surveillance and Monitoring

No substantive revisions were made to this chapter.

Appendix

The appendix has been updated.

Note to the Basin Plan reviewer regarding 1990 Amendments to the Basin Plan addressing Pesticides

In 1990 the Regional Water Board adopted Resolution No. 90-028, which amended portions of the Basin Plan. This amendment included water quality objectives and implementation programs for pesticides. None of the provisions included in the 1990 amendment have been changed or revised as part of the current update activity because they are the subject of litigation. The Regional Water Board is not soliciting comments on those portions of the Basin Plan at this time.

ISSUE ANALYSIS

The following sections contain analyses of the issues related to the proposed amendment to the existing Basin Plan with emphasis on proposed regulatory revisions. Proposed revisions which staff considers to be regulatory have been highlighted with vertical lines in the margin on the redline/ ~~strikeout~~ version of the proposed Basin Plan. The staff analysis presents the present policy, a description of the issue, a description of alternatives considered, a staff recommendation, and analyses of attainability, economics, and environmental impacts (where applicable).

The specific purpose of each proposed regulatory provision (references are provided in parentheses) is to directly address the significant issue described in the following analysis. The information which summarized the necessity for each of these provisions is provided as part of the recommendation.

Issue 1 - Definition of Ground Water (Chapter I, page I-1)

Present Policy

The term "ground water" is not defined in the existing Basin Plan. However, as defined in the Porter Cologne Act "'waters of the state' means any water, surface or underground, including saline waters, within the boundaries of the state." Water Code Section 13050(e). The term "ground water" is used by the State and Regional Water Boards to refer to the underground (subsurface) "waters of the state." See, e.g., State Water Board Order No. WQ 86-13 (BKK Corporation).

Issue Description

The Regional Water Board's use of the term "ground water" for basin planning purposes is not clear because the Basin Description (Chapter I) in the existing Basin Plan does not specifically define the term. As a result, the existing Basin Plan's application to ground waters of the Region may be misunderstood. It is possible to incorrectly interpret the existing Basin Plan to apply only to the ground water bodies that are listed in Chapter II. However, the existing Basin Plan applies to all ground waters of the Region.

Alternatives

1. NO ACTION. No action would continue the undefined use of the term "ground water" as specified in the existing Basin Plan; therefore, the scope of coverage of the Basin Plan with respect to ground waters of the Region would continue to be unclear.

2. AMEND CHAPTER I OF THE BASIN PLAN TO INCLUDE A DISCUSSION AND DEFINITION OF "GROUND WATER". Including a specific discussion of ground waters, and using a definition to explain the term "ground water" in Chapter I, would provide a clear and consistent basis for understanding the Regional Water Board's existing approach to protecting the quality of ground waters of the Region.

Staff Recommendation

Adopt Alternative 2. Staff recommends this alternative as the most effective, reasonable, and necessary method to eliminate potential ambiguity regarding applicability of ground water provisions in the existing Basin Plan. This ambiguity could result in incorrect application or interpretation of Basin Plan requirements. The following language is proposed:

> "Therefore, for basin planning and regulatory purposes, the term "ground water" includes all subsurface waters that occur in fully saturated zones and fractures within soils and other geologic formations, whether or not these waters meet the definition of an aquifer or occur within identified ground water basins."

A definition of the term "ground water" which is consistent with the definition of the "waters of the state" set forth in Division 7 of the California Water Code is necessary to adequately protect ground water outside ground water basins identified in Chapter II of the existing Basin Plan. The revised language will allow the regulated community to more easily understand how the Basin Plan is consistent with the existing ground water programs and regulations which are designed to protect the underground (subsurface) "waters of the state".

This amendment would provide clarification and does not include any new requirements; therefore, it would have no environmental or economic consequences.

Issue 2: Beneficial Use Definitions (pages II-1, II-2, and II-3)

The beneficial use definitions have been re-worded to be consistent with the definitions used by the other Regional Water Boards. The revised definitions do not significantly change the meaning of any of the beneficial use definitions in the existing Basin Plan. The following new definitions are added to the proposed Basin Plan, in addition to the beneficial use definitions in the existing Basin Plan: Commercial and Sport Fishing (COMM), Aquaculture (AQUA), Estuarine Habitat (EST), Preservation of Biological Habitats of Special Significance (BIOL), and Shellfish Harvesting (SHELL). However, no water bodies have been assigned these new beneficial uses. There are no known adverse environmental or economic impacts that would result from these new and revised definitions.

Issue 3: New Surface Water Maps and Format of Table II-1 (pages II-3, Table II-1)

The existing Basin Plan covers an area which is divided into three sub-basins: the Sacramento River Basin (5A), the Sacramento-San Joaquin Delta Basin (5B), and the San Joaquin River Basin (5C). New maps are provided in the proposed Basin Plan that divide the area into hydrologic basins to be consistent with other agencies' planning boundaries. By separating the maps into hydrologic basins, the area is divided into two basins instead of three, dividing the Delta. The two new basins are called the Sacramento River Basin and San Joaquin River Basin.

Table II-1 was also changed to reflect changes in the new maps. The Table in the existing Basin Plan lists beneficial uses for "Other Lakes and Reservoirs in Basin 5B". Because of the new dividing line, lakes and reservoirs in 5B will now be in either the Sacramento River Basin (which encompasses all of Basin 5A and a portion of Basin 5B) or the San Joaquin River Basin (which encompasses all of Basin 5C and a portion of Basin 5B). In the existing Basin Plan, Basins 5A and 5B have the same beneficial uses for "Other Lakes and Reservoirs" so there is no change. Basin 5C, however, differs from Basin 5B in the existing Basin Plan for agriculture (AGR) and industrial process (PRO) for "Other Lakes and Reservoirs". The simplest way to list the remaining "Other Lakes and Reservoirs in Basin 5B" that don't have the same beneficial uses as those in the San Joaquin River Basin is to list them by hydrologic unit, rather than by basin. This does not result in any changes in beneficial uses of the water bodies in question. There are no known adverse environmental or economic impacts that would result from these changes.

Issue 4: MUN Beneficial Use Designation for Cache Creek (page II-3, Table II-1)

Present Policy

On Table II-I of the existing Basin Plan, Cache Creek (from Clear Lake to Yolo Bypass) is not designated as an "existing" source of drinking water.

Issue Description

Interested parties have requested that Cache Creek be designated as an "existing" source of drinking water. Although the Regional Water Board is not aware of any direct use of Cache Creek water for municipal use, there are some shallow supply wells in close proximity to the Creek that are used for municipal purposes. It is reasonable to assume that, because of recharge, the water quality in the shallow wells is essentially the same as Cache Creek water. In any case, under the "Sources of Drinking Water Policy" (State Water Board Resolution No. 88-63, described on Page IV-10 of the Draft Basin Plan), Cache Creek is considered to be suitable, or potentially suitable, for municipal or domestic water supply.

Since it is a source of drinking water, the Regional Water Board provides the same level of protection for Cache Creek as it does for other water bodies named in Table II-1 that are listed as having the "existing" MUN beneficial use. However, public perception is that greater protection would be provided for water bodies specifically listed in the table as having an "existing" use.

Alternatives

1. NO ACTION. This would leave no indication in Table II-1 that Cache Creek is designated as an "existing" source of drinking water. At this time, the Regional Water Board provides the same level of protection for water bodies listed as having the "existing" beneficial use for MUN as those water bodies covered under the "Sources of Drinking Water Policy", so there would be no difference. However, public perception is that greater protection would be provided for a water body listed in the table as having an "existing" use.

2. ADD THE "EXISTING" MUN BENEFICIAL USE DESIGNATION TO TABLE II-1 FOR CACHE CREEK (FROM CLEAR LAKE TO YOLO BYPASS). At the present, this would not have any significance, since the Regional Water Board provides the same level of protection for water bodies listed in Table II-1 as having the "existing" beneficial use for MUN as those water bodies covered under the "Sources of Drinking Water Policy". However, this distinction could be significant if the Regional Water Board, at some future date, determined that "existing" uses warranted greater protection. The close association of the existing shallow wells with Cache Creek makes it seem reasonable to treat the Creek as an "existing" source of drinking water. There is no harm in making this change and it would appear to provide some measure of assurance to the public that their municipal water supply will be protected.

Staff Recommendation

Staff recommends the second alternative. There are no significant consequences and it provides the public with a sense that their water supplies will be protected. Because the Regional Water Board currently provides the same level of protection for water bodies listed in Table II-1 as having the "existing" beneficial use for MUN as those water bodies covered under the "Sources of Drinking Water Policy", there are no known adverse environmental or economic impacts that would result from this change.

Issue 5: Revise the Tributary Statement (page II-3, Table II-1)

Present Policy

Table II-I of the existing Basin Plan, titled Surface Water Bodies and Beneficial Uses, names 96 of the most important surface waters in the Sacramento River Basin, San

Joaquin River Basin and the Delta. For each of these named waters, the table identifies their existing beneficial water uses and their potential beneficial water uses. These uses, taken together, are termed the "designated" beneficial uses in reference to the fact that the Regional Water Board has explicitly recognized these waters by name, and associated with each an array of appropriate beneficial uses pursuant to state and federal law.

At the bottom of Table II-I is a footnote that reads "(1) Those streams not listed have the same beneficial uses as the streams, lakes, or reservoirs to which they are tributary." This footnote is often referred to as "the tributary rule" or "the tributary footnote".

Because the existing tributary footnote has proven to be inflexible and unworkable, Regional Water Board staff now proposes to remove or modify it. The following history provides the background of the present policy.

The Regional Water Board adopted the first edition of its Basin Plan on 25 July 1975. That Basin Plan contained Figure 2-1, titled Surface Water Bodies and Beneficial Uses, which is essentially the same as Table II-I in the Second Edition, the only difference being a few minor corrections in the latter edition. The first edition also contained the tributary footnote.

At the time of its adoption, the Regional Water Board knew Figure 2-1 was incomplete, its 96 named water bodies being only a tiny fraction of the region's estimated 10,000 waters. But the Basin Plan at least included the major rivers, lakes and reservoirs, and the larger creeks, that together contain most of the region's surface water. The Regional Water Board envisioned that, in the ensuing years; there would be a continuing planning process in which tributaries of the major water bodies would be investigated in some priority fashion, and the beneficial uses of these tributaries would be identified and designated in periodic amendments to the Basin Plan. In the interim, the Regional Water Board knew it would need to make decisions involving waters not named in Figure 2-1 and for which little detailed information was available. The tributary footnote was thus conceived to bridge the information gap and provide guidance until factual information was available.

Due to resource limitations, the continuing planning process did not evolve as anticipated, and the staff-intensive effort needed to identify the beneficial uses of the 9,900 lesser water bodies was never funded nor undertaken. Years after adoption of the first edition, the Basin Plan's beneficial use designations remain uncompleted.

In April 1991, the State Water Board adopted its Water Quality Control Plan for Inland Surface Waters (ISWP). That plan put in place statewide numerical and narrative water quality objectives for toxic materials designed to protect human health and freshwater aquatic life. These water quality objectives apply in water bodies whose identities and beneficial use designations are listed in regional Basin Plans.

An equally important feature of the ISWP was a procedure for identifying and designating the beneficial uses of three distinct classes of waters: ephemeral streams, effluent dominated waters, and constructed agricultural drains. The ISWP provided a six year time schedule to allow Regional Water Boards to complete that work and adopt appropriate site specific objectives.

In September 1992, the Regional Water Board adopted and transmitted to the State Water Board a list of 6,535 water bodies considered candidates for beneficial use investigations and designations in those three classes. That work was subsequently halted and the funding withdrawn by the State Water Board following USEPA's rejection of portions of the ISWP pertaining to beneficial uses designations.

USEPA staff have invoked the tributary footnote as the appropriate principle governing the selection of beneficial uses, even in the face of conflicting facts. The ISWP is the case alluded to. In the ISWP, the State Water Board proposes to make scientific findings as to what the beneficial uses are and then designate them. USEPA says there is no need for fact findings, the Tributary Footnote tells us all we need to know.

In an earlier action, the State Water Board rejected a portion of a Basin Plan amendment that designated beneficial uses for Mud Slough (North) and Salt Slough, tributaries to the San Joaquin River, because the Regional Water Board's findings of fact were at odds with the tributary footnote (See State Water Board Resolution No. WQ 89-88).

Issue Description

The tributary footnote, intended as a temporary palliative for the lack of beneficial use information when formulating tentative waste discharge requirements and enforcement documents, is being misunderstood and misused by various parties. The Regional Water Board never intended that the footnote serve as the foundation for establishing water quality objectives. And, the Regional Water Board certainly never intended that the footnote should prevail over findings of scientific fact, as occurred in the two cases cited earlier. If consequences of such misuse were trivial, it could easily be ignored. But, it will profoundly affect staff activities and Regional Water Board decisions in the decade ahead, as statewide objectives are implemented. The economic consequences to dischargers will likewise be considerable.

The tributary footnote says, in effect, that all tributaries to the water bodies listed in the Basin Plan have precisely the same beneficial uses as the water bodies to which they are tributary, without exception, exemption, or qualification. The truth of the tributary footnote can be proven only by examining every case (i.e., every tributary/listed water body pair) and demonstrating its truth in all cases. On the other hand, the tributary footnote can be disproved by finding a single counter-example (i.e., a tributary/listed water body pair in which one or more of their beneficial uses differ).

In the real world of the Central Valley's watersheds, exceptions to the tributary footnote abound. A suitable example is Spring Creek, in Shasta County. Spring Creek conveys acid mine drainage impounded behind Spring Creek Debris Dam to the Sacramento River, where it becomes diluted in the water released from Shasta Reservoir. Spring Creek's water is strongly acidic and contains lethal concentrations of a number of heavy metals, including copper, zinc, and cadmium. Massive fish kills occur in the Sacramento River whenever Spring Creek's flow cannot be regulated in suitable ratio to the Shasta Reservoir release.

Under a literal application of the Tributary footnote, Spring Creek's beneficial uses include:

- Municipal and Domestic Supply
- Agriculture (irrigation and stock watering)
- Recreation (contact, canoeing and rafting)
- Freshwater Habitat (cold and warm)
- Migration (cold and warm)
- Wildlife Habitat
- Navigation

In fact, Spring Creek's water is at all times unsuitable for supporting any of these uses, and none of them are being realized. Thus, the fundamental premise of the tributary footnote is false.

Although the important beneficial uses of most water bodies and their tributaries are often the same, the tributary footnote, if applied to all tributaries, is inaccurate.

Alternatives

The Regional Water Board has three choices with respect to the tributary footnote:

1. NO ACTION. Under this alternative, the tributary footnote would remain unchanged in Table II-1. A false statement makes a shaky foundation for a regulatory program, so this choice should not be seriously considered. Further, as long as the footnote continues to be misused, it will continue to interfere with the Regional Water Board's conduct of its business. Examples of inappropriate uses of the tributary rule are described above, under *Present Policy*.

2. CHANGE THE FOOTNOTE. This could be done in two ways: rewrite it so that it is accurate, or condition its applicability to cause the same effect. If the footnote were restated to say "Some of those streams not listed have some of the same beneficial uses as the streams, lakes, or reservoirs to which they are tributary" it would be accurate, but it would be of no apparent usefulness. Or, it could be conditioned to say its use is limited to preparing waste discharge requirements and enforcement

orders in the absence of factual information, and it will be corrected as the facts become known. This reflects the way the footnote is currently being used by the Regional Water Board.

3. DELETE THE FOOTNOTE AND ADD NEW CLARIFYING LANGUAGE. New clarifying language could be added to the Basin Plan text to more explicitly describe how the Regional Water Board applies beneficial uses, in the absence of scientific fact, to waters tributary to the water bodies listed in Table II-1. The footnote to Table II-1 would then be deleted. This alternative would eliminate much of the confusion caused by the wording of the tributary footnote, without changing its intended meaning.

Staff Recommendation

Adopt alternative 3. Clarifying language is necessary to eliminate the ambiguity caused by the tributary footnote. The following language is proposed:

"The beneficial uses of any specifically identified water body (identified in Table II-I) generally apply to its tributary streams. In some cases a beneficial use may not be applicable to the entire body of water. In these cases the Regional Water Board's judgement will be applied.

It should be noted that it is impractical to list every surface water body in the Region. For unidentified water bodies, the beneficial uses will be evaluated on a case-by-case basis."

The proposed new language clarifies the intended meaning of the tributary footnote when it was originally adopted by the Regional Water Board in 1975. Beneficial uses of any water body specifically identified in Table II-1 will *generally* apply to its tributary streams, except in cases where the Regional Water Board determines that a beneficial use is not applicable. It also notes the need to evaluate beneficial uses for unidentified water bodies (i.e. water bodies not listed in Table II-1) on a case-by-case basis, since it is impractical to list every surface water body in the region. This is due to the fact that beneficial uses have yet to be identified for roughly 9900 water bodies in the region and, currently, there is insufficient staff and funding available to identify the beneficial uses of those water bodies.

The proposed language eliminates present and future problems of misinterpretation and misuse, and removes a known falsehood from the Basin Plan. This approach allows for collection of information to better determine what beneficial uses need to be protected. It avoids the problems created by applying inaccurate beneficial uses to some water bodies. The proposed language clarifies how the Regional Water Board already interprets the tributary statement in the existing Basin Plan. Therefore, there are no

known adverse environmental or economic impacts that would result from the proposed new language.

To the extent the tributary statement has been misapplied by other agencies in the manner described above, the proposed language may result in economic savings for dischargers to tributaries with less restrictive beneficial uses than the downstream water bodies. Any corresponding environmental impacts will be insignificant because all appropriate beneficial uses (and the water quality objectives that protect those beneficial uses) will still apply.

Issue 6: Update ground water beneficial use designations (Chapter II, pages II-3 to II-4)

Present Policy

Beneficial uses which currently apply to the major ground water bodies of the Region are presented in Table II-2 of the existing Basin Plan. Municipal and domestic supply, irrigation, stock watering, industrial process supply, and industrial service supply are the beneficial use designations listed in the Table. Ground waters of the Region that are not listed in Table II-2 are assigned municipal and domestic water supply (MUN) designations in accordance with the provisions of State Water Resources Control Board Resolution No. 88-63 (Sources of Drinking Water Policy) which is incorporated, by reference, as part of the existing Basin Plan. Pursuant to the Sources of Drinking Water Policy, all surface and ground waters of the State are considered suitable, or potentially suitable, for MUN and should be so designated by the Regional Water Boards with the exception of waters that meet criteria specified in the Policy.

Issue Description

State and Regional water resources have become increasingly important in response to the needs of a steadily growing state population. In particular, demands for usable ground water are more extensive than in past years and are expected to continue to grow. In many parts of the Region, discharges associated with the use and disposal of both hazardous and non-hazardous chemicals and wastes have resulted in long term impacts to ground water quality. These impacts have the potential to significantly reduce the amount of ground water available for beneficial use. Recurring drought conditions in the Region in recent years have placed additional emphasis on the importance of ground water resources for both existing and potential uses. Droughts, increasing population, and the realization that reduced diversion of surface waters is needed to protect aquatic species has resulted in more extensive development of ground water supplies throughout the region. As a result, the beneficial use designations for ground water in the existing Basin Plan no longer adequately correspond to how ground water in many areas of the Region is being, or is likely to be, beneficially used.

The beneficial uses designated for the major ground water bodies listed in Table II-2 of the existing Basin Plan were established based on the known existing uses of these waters in 1975, when the Basin Plan was first adopted. These ground water bodies are illustrated on Figure II-2 of the existing Basin Plan. Table II-2 and Figure II-2 were not updated in 1989 when the existing edition of the Basin Plan was published. According to California Department of Water Resources records, Figure II-2 no longer provides an accurate identification or delineation of the boundaries of the major ground water bodies of the Region. See, e.g., Department of Water Resources Bulletin 118-80.

The beneficial use designations for these bodies are no longer representative of the actual beneficial uses of the waters, or the areal extent of such uses. Beneficial uses of ground waters not specifically named in the Basin Plan have been recognized by the Regional Water Board. Whenever the Regional Water Board takes an action which could affect ground water quality (whether or not the ground water basin is named in the Basin Plan) the Regional Water Board evaluates present and potential beneficial uses of the affected ground water. Under the existing Basin Plan, ground waters in areas outside the major ground water bodies are mainly designated pursuant to the Sources of Drinking Water Policy. Beneficial uses of irrigation, stock watering, and industrial are also specifically identified for ground waters bodies where these uses were known to exist in 1975.

Since 1975, it has become apparent to the Regional Water Board that there is more widespread agricultural and industrial use, in addition to municipal and domestic use, of ground waters in many areas of the Region. For example, in the Sierra foothills and Coast Ranges, existing uses of ground water include stock watering, irrigation of grapes and orchard crops, and mining and ore processing. Ground water wells also supply the industrial processes of electronic equipment manufacturers, lumber mills, and other industries throughout the Region. While it has always been the Regional Water Board's intention and duty to protect all beneficial uses, wherever they occur (see Water Code Section 13000), the existing Basin Plan language is not clear on this point.

In most cases, the designation of municipal and domestic water supply requires maintaining the highest water quality; however, for some ground water parameters and constituents, standards necessary to protect existing or potential agricultural and industrial uses may be more stringent. For example, specific conductivity and chloride levels should not exceed 700 micromhos/centimeter and 106 milligrams/liter, respectively, for unrestricted agricultural use. Ayers & Westcot, *Water Quality for Agriculture*, Food & Agriculture Organization of the United Nations, 1985. By contrast, the limiting concentrations for municipal and domestic use are 900 micromhos/centimeter and 250 milligrams/liter, respectively. 22 California Code of Regulations, Division 4, Chapter 15. Because beneficial uses of ground waters outside the major ground water bodies are currently inappropriately designated, neither existing nor probable future beneficial uses of these waters are adequately being protected.

The ongoing demands on regional ground water resources emphasize the need to protect the availability of these resources for a variety of future beneficial uses. Water Code Section 13000 states, in part, that "the quality of all the waters of the state shall be protected for use and enjoyment by the people of the state." The Regional Water Board uses the term "potential beneficial use" to protect water bodies where the existing water quality is suitable for future beneficial use, but it may not have the use at the present time.

However, the existing Basin Plan specifically protects potential beneficial uses of ground water only pursuant to the Sources of Drinking Water Policy. Potential uses of ground water for agricultural supply and industrial activities represent important opportunities for growth and prosperity in the Region. As such, protection of these uses has become critical to adequate regional water quality management. Because water quality criteria associated with these uses are, in several cases, more stringent than needed for MUN the current policy allows the quality of ground waters to be degraded to a degree that unreasonably affects these beneficial uses.

Alternatives

1. NO ACTION. No action would continue application of the beneficial use designations as identified in the existing Basin Plan. Beneficial use designations are key elements of the Basin Plan which are used to protect against water pollution. The current designations do not correspond to the widespread existing and probable future beneficial uses of ground waters of the Region. These designations do not provide for effective long-range regional ground water resource planning, quality control, and management.

2. REVISE GROUND WATER BODIES AND BENEFICIAL USE DESIGNATIONS USING DWR BULLETIN 118-80 MAPS. Since 1975, the time that the current map (Figure II-2) was published, the Department of Water Resources (DWR) has published updated maps (Bulletin 118-80) that provide more detailed and accurate representations of the areal extent of the major ground water bodies of the Region. Under this alternative, DWR Bulletin 118-80 maps would be referenced to replace the current Figure II-2 map. The revised Basin Plan would include major ground water body names and boundaries to correspond to DWR Bulletin 118-80.

   This approach would result in changes from the current beneficial uses designated in Table II-2 in cases where new bodies or different body boundaries are identified. The potential be ficial uses of major ground water bodies would continue to be identified pursuant to the Sources of Drinking Water Policy. However, this approach would not modify current or potential future beneficial use designations of ground waters outside the major ground water bodies that are identified in DWR Bulletin 118-80. Thus, the beneficial use designations would remain limited and

inappropriate with respect to current and future demands on ground water resources.

3. REVISE GROUND WATER BODIES AND BENEFICIAL USE DESIGNATIONS USING DWR BULLETIN MAPS AND ACTUAL WATER USE INFORMATION. Under this alternative, updated DWR Bulletin 118-80 maps would be referenced to replace the current Figure II-2 map and actual water use information would be compiled for the ground waters of the Region. This information, along with an evaluation of potential beneficial uses of these ground waters, would be used to identify appropriate beneficial use designations.

Collecting existing and potential beneficial use information regarding major ground water bodies; and addressing ground waters in the Region outside the major ground water bodies would require the expenditure of staff resources far beyond current and projected funding levels. Although several sources of geographical data and water supply quality and use information are available, this information is not sufficient for a complete and accurate data base. Water bearing zones must be delineated both horizontally and vertically, because vertical stratification of water bearing zones could result in differences in existing and potential beneficial uses of shallow versus deep ground water. Detailed site-specific geologic information would be required to delineate these differences. An extensive effort to fill data gaps, and to address inaccuracies and insufficiencies would be necessary.

Limiting this effort to the major ground water bodies would result in continued application of only municipal and domestic water supply designations, assigned in accordance with the provisions of the Sources of Drinking Water Policy, for waters outside of the major ground water bodies. The inadequacies of these current designations are discussed above.

While this alternative could eliminate the inadequacies of the current ground water beneficial use designations, an inordinate amount of staff resources and time would be required to compile the necessary information and to tabulate specific beneficial use designations for the ground waters of the Region.

4. DELETE FIGURE II-2 AND TABLE II-2 AND ADD A NARRATIVE STATEMENT THAT DESIGNATES BENEFICIAL USES FOR ALL THE GROUND WATERS OF THE REGION. Beneficial use designations for all ground waters of the Region would be identified in accordance with a narrative description.

In addition to municipal and domestic supply, the narrative description would designate agricultural supply, industrial service supply, and industrial process supply as suitable, or potentially suitable beneficial uses for all ground waters in the Region. Exceptions to these designations would be permitted on a case-by-case basis using site-specific factors.

The provisions of the Sources of Drinking Water Policy, currently incorporated by reference, would be directly specified in the Basin Plan, including the criteria for consideration by the Regional Water Board in making exceptions to the beneficial use designation of municipal and domestic supply. Exceptions to agricultural and industrial supply beneficial use designations would be made using relevant subsets of the specific criteria set forth in the Sources of Drinking Water Policy. Based on the current knowledge of extensive uses of ground waters in the Region for agricultural supply and industrial activities, and on the probable increase of these uses in the future, this alternative would appropriately eliminate the inadequacies of the existing beneficial use designations, while allowing exceptions ~~to these beneficial~~ use designations to be acknowledged by the Regional Water Board on a ~~case-by-~~ case basis.

Staff Recommendation

Adopt Alternative 4. Staff recommends this alternative as the most effective, appropriate, and reasonable method to ensure proper management and control of ground water quality in the Region. As discussed in the issue description, staff has identified inadequacies and a lack of clarity in the existing Basin Plan which have resulted in a need to modify beneficial use designations at this time.

With the dramatic rise in California 's population (nearly 31 million people in 1992, a 26% increase since 1980; even with the recession, expected to reach 63 million by 2040) comes a rapidly increasing demand for high quality water supplies. With the growing demands on the surface waters of the Central Valley Region (the Region 's major surface water systems furnish roughly 51% of all of the state 's water supply) and the recent decision of USEPA to reduce withdrawals of surface water from the Delta, in-basin users are increasingly relying on ground water supplies. This increasing demand for both surface and ground waters in California, and specifically those of the Central Valley Region, points to a reality that whatever water is suitable for beneficial uses will be used for these purposes in the foreseeable future.

The significantly increasing demands being made on ground water resources in the Region and the lack of Regional Water Board resources that would be needed to delineate specifically where ground waters are unsuitable for each beneficial use at this time have resulted in the need to designate beneficial uses in addition to municipal and domestic supply for all ground water, including ground water outside the major ground water bodies identified in DWR Bulletin 118-80. Widespread agricultural and industrial ground water uses, both existing and potential, have resulted in a need to acknowledge these as beneficial uses in the Basin Plan in order to ensure their protection. Examples of such uses include the vineyards in Amador, Lake, and El Dorado Counties; the apple and pear orchards in El Dorado County; equipment manufacturers, such as Tavis Inc. in Mariposa County; and mining companies, such as Sonora Mining Company Jamestown Project in Tuolumne County.

Section 13000 of the Water Code states, in part, that "the quality of all waters of the state shall be protected for use and enjoyment by the people of the state." The people of the state have the right to use ground water other than as a source of drinking water. This right must be preserved through the protection of the quality of ground water for such use. Ground water considered to be suitable, or potentially suitable, for municipal and domestic supply can, in many cases, be considered as suitable for agricultural supply, industrial service supply, or industrial process supply. However, certain water quality criteria associated with these uses can be more restrictive than the corresponding drinking water criteria. Some agricultural uses are more sensitive to certain parameters, such as total dissolved solids, copper, and zinc. Metals, such as manganese and iron, can be present in concentrations which would limit use for manufacturing processes. Industrial processes can have a low tolerance to hard water ions, such as calcium and magnesium resulting in a need for lower concentrations than are required for drinking water. Therefore, the use of ground water for agriculture and industry can only be adequately protected by identifying agricultural supply, industrial service supply, and industrial process supply as beneficial use designations in the Basin Plan for all ground waters of the Region.

All ground water bodies identified in the existing Basin Plan (in Figure II-1 and Table II-1) are currently designated for municipal and domestic supply and for agricultural supply. Water of sufficient quality to be suitable for these uses is also potentially suitable for at least certain industrial process and service uses, even though the existing Basin Plan designates only a few ground water bodies for these industrial supply uses. This situation is the result of 1975 beneficial use designations for ground water being based largely on uses existing at that time. In addition, industrial uses of ground water currently exist within ground water basins that are not designated for industrial uses in the existing Basin Plan. Therefore, it is reasonable that all ground waters for which beneficial uses are specifically designated in the existing Basin Plan (in Figure II-1 and Table II-1) are potentially suitable for industrial process and service uses and should, therefore, be so designated.

This alternative would set forth the agricultural supply, industrial service supply, and industrial process supply beneficial use designations in a manner consistent with the Sources of Drinking Water Policy for applying municipal and domestic supply beneficial uses. To ensure that beneficial use designations are applied in a reasonable manner, exceptions must be provided for ground waters that are not of a quality or quantity reasonably suitable for a designated use. Criteria for making such exceptions should be consistent with the criteria that were already adopted by the State Water Board as part of the Sources of Drinking Water Policy.

The exception criterion for water sources that "[do] not provide sufficient water to supply a single well capable of producing an average, sustained yield of 200 gallons per day" in the Sources of Drinking Water Policy is designed to be protective of single family dwelling domestic users. The proposed exception criteria for agricultural and industrial

supply include the same provision, because of the likelihood that industrial and agricultural uses will require equal or larger quantities of water than single family dwelling domestic uses.

Ground water that is not considered suitable, or potentially suitable, for municipal and domestic supply can, in some cases, be considered suitable for agricultural supply, industrial service supply, or industrial process supply use. For example, water with high levels of total dissolved solids (in excess of 3,000 mg/l) is known to be used for agricultural supply, industrial service supply and industrial process supply. Geothermal energy producing waters are also known to have industrial uses. As a result, the proposed Basin Plan adopts only those exception criteria from the Sources of Drinking Water Policy that are appropriate for these beneficial uses.

It is necessary to ensure that beneficial use designations are consistent with existing and potential uses in order to adequately protect the quality of water resources in the Region. This alternative is the only practicable method available to adequately, and reasonably, address all ground waters of the Region.

There are costs associated with the extension of agricultural and industrial beneficial use designations to ground waters that are currently not designated for these uses. Where background water quality is suitable for these beneficial uses, the Regional Water Board will require that degradation not occur so as to unreasonably affect these uses. This may place additional limitations on permitted waste discharges that have the potential to affect ground water quality where the constituents of concern have more stringent beneficial use protective limits for agricultural or industrial supply than for municipal and domestic supply. Similarly, additional cleanup and abatement under Water Code Section 13304 may also be required for discharges that have impaired these newly designated beneficial uses. Where a discharger chooses to seek exemption from one or more beneficial use designation based on the exception criteria, development of the case for consideration by the Regional Water Board will involve the expenditure of both private and state resources.

There may be both positive and negative environmental impacts from the added beneficial use designations. Potential environmental impacts are discussed following the CEQA checklist (see Appendix 1).

Issue 7: Update maximum contaminant level (MCL) criteria in water quality objectives for both surface and ground waters and clarify that more stringent limits may be applied. (Chapter III, pages III-3, III-7, III-11)

Present Policy

The water quality objectives for Chemical Constituents and Radioactivity in the existing basin plan include a reference to Maximum Contaminant Levels (MCLs) from Title 22.

of the California Code of Regulations (CCR), Division 4, Chapter 15, as water quality limits. The MCLs from Title 40 of the Code of Federal Regulations (CFR), Parts 141 and 143 are not referenced as water quality limits in the existing narrative objectives.

The Regional Water Board reviews the water quality objectives, and the limits described, on a case-by-case basis and applies limits to assure protection of all beneficial uses. This may result in the need to apply limits more stringent than MCLs.

The existing Basin Plan (p.III-2) indicates that in response to the antidegradation directives of State Water Board Resolution No. 68-16 (Antidegradation Policy), the maintenance of the existing high quality of water (i.e., "background") is the Regional Water Board's initial goal. "Background" means the concentrations or measures of constituents or parameters in water or soil that have not been affected by the discharge in question. This goal of "background" defines the most stringent limits that the Regional Water Board may require for water quality protection. The water quality objectives specified in the Basin Plan and in other applicable Water Quality Control Plans represent the least stringent limits required for water quality protection.

Issue Description

The current water quality objectives have not been updated since 1989 when the existing Basin Plan was published. As presented, the existing water quality objectives for Chemical Constituents and Radioactivity lack comprehensiveness and clarity with respect to water quality limits. Specifically, the federal MCL criteria are not included as references in these objectives; therefore, the existing Basin Plan is not consistent with provisions of the federal Safe Drinking Water Act (42 U.S.C. Section 300f et seq.).

In addition, the existing objectives do not explicitly state that the Board may apply limits that are more stringent than MCLs.

Alternatives

1. NO ACTION. No action would continue use of the existing Chemical Constituents and Radioactivity objectives as currently set forth. As previously indicated, the MCL criteria are not up-to-date, and the application of water quality limits more stringent than MCLs is not clear.

2. UPDATE THE WATER QUALITY OBJECTIVES FOR CHEMICAL CONSTITUENTS AND RADIOACTIVITY USING FEDERAL MCL CRITERIA AND CLARIFY THAT MORE STRINGENT LIMITS MAY BE APPLIED. This alternative would update the Chemical Constituents and Radioactivity water quality objectives in the existing Basin Plan to include federal Primary MCL criteria and an additional statement to clarify that the Regional Water Board may apply limits more stringent than MCLs in order to protect all beneficial uses.

Staff Recommendation

Adopt Alternative 2. The existing water quality objectives should be updated to ensure that numerical limits set forth in compliance with narrative water quality objectives for Chemical Constituents and Radioactivity in the Basin Plan are consistent with provisions of the federal Safe Drinking Water Act. The existing basin plan specifies that water designated for use as domestic or municipal supply must be in compliance with state MCLs. This alternative would update the water quality objectives to ensure that the water quality objectives are also at least as stringent as the federal Primary MCLs. Section 4023.1 (a)(3) of the Health and Safety Code requires that state Primary MCLs be at least as stringent as federal Primary MCLs. This alternative provides consistency with the Health and Safety Code and the federal Safe Drinking Water Act.

This alternative would also provide language to clarify that, pursuant to Water Code Section 13000 and State Water Board Resolution No. 68-16 (Antidegradation Policy), the Regional Water Board may apply limits more stringent than state and federal Primary MCLs and Secondary MCLs (SMCLs) to ensure the reasonable protection of beneficial uses and the prevention of nuisance. Primary MCLs are derived from health based criteria (by USEPA from MCL Goals; by the state Department of Health Services from one-in-a-million (10^{-6}), incremental cancer risk estimates for carcinogens and from threshold toxicity levels for non-carcinogens) in conjunction with technologic and economic factors relating to the feasibility of achieving and monitoring these concentrations in drinking water supply systems. This balancing of health effects with technologic and economic considerations in MCLs is not necessarily applicable to attaining the highest water quality that is reasonable in the protection of surface and ground water as a resource for all beneficial uses.

Numerical limits more stringent than MCLs and SMCLs are needed to be fully protective of beneficial uses in many situations. For example, limits for the following constituents and parameters which are protective of agricultural use are significantly lower than MCLs or SMCLs:

Constituent	MCL/SMCL		Agricultural Use Criteria*	
Chloride	250	mg/l	106	mg/l
Zinc	5	mg/l	2	mg/l
Specific Conductivity	900	umhos/cm	700	umhos/cm
Total Dissolved Solids	500	mg/l	450	mg/l

* Ayers & Westcot, *Water Quality for Agriculture*, Food & Agriculture Organization of the United Nations (1985).

In surface waters, or in the case of fresh ground water replenishment to surface waters that are designated for protection of aquatic life, most MCLs and SMCLs for metallic

constituents will not be sufficiently protective of beneficial uses. Aquatic life-protective numerical limits are often below MCLs and SMCLs for metallic constituents.

Even for protection of drinking water supplies, MCLs and SMCLs are not always protective of this beneficial use of a water resource. MCLs are designed to apply to water within a drinking water distribution system and at the tap. As previously discussed, MCLs are derived from health based criteria in conjunction with technologic and economic factors relating to the feasibility of achieving and monitoring these concentrations in drinking water supply systems. This balancing of health effects with technologic and economic considerations in the derivation of MCLs is not necessarily applicable to the protection of sources of drinking water (a raw surface or ground water resource).

A common example of incorrect MCL application is the use of the total trihalomethane (THM) MCL for the protection of ground water from chloroform. Chloroform is one of the four chemicals covered by the term "trihalomethanes ". These probable human carcinogens are formed in drinking water by the action of chlorine, used for disinfection, on organic matter present in the raw source water. The total THM Primary MCL of 100 micrograms/liter is 17 to 230 times higher than the published one-in-a-million incremental cancer risk estimates for chloroform. USEPA has stated that the MCL for total THMs was based mainly on technologic and economic considerations. The MCL for total THMs was derived by balancing the benefit provided by the chlorination process (elimination of pathogens in drinking water) with the health threat posed by the trihalomethane by-products of this process and the cost associated with conversion to other disinfection methods. Since ground water has not yet been chlorinated and may not require chlorination before use, this type of cost/benefit balancing (accepting some cancer risk from chloroform and other THMs in order to eliminate pathogens and avoid conversion costs) is not germane to ground water protection. Therefore, the total THM MCL is not sufficiently protective of the ambient quality of domestic water supply sources. The published one-in-a-million incremental cancer risk estimates (ranging from 0.43 to 6 micrograms/liter) are more accurate measures of potential impairment by chloroform of the beneficial use of ground water for domestic supply. Staff of USEPA, Region 9 (San Francisco), Water Management Division has supported the application of a one-in-a-million cancer risk estimate, instead of the total THM Primary MCL, as a numerical water quality limit for chloroform in ground water as consistent with the intent of the federal Clean Water and Safe Drinking Water Acts. In conclusion, the total THM MCL is not appropriate for protection of the quality of a water resource from pollution by chloroform.

The existing Basin Plan contains a narrative water quality objective for tastes and odors in both surface and ground waters. Taste and odor thresholds for the petroleum-based fuel constituents toluene, xylene, and ethylbenzene are significantly lower (20 to 100 times more restrictive) than the primary MCLs for those substances. To comply with the water quality objective for tastes and odors, limits must be established at the taste and

odor threshold, not the primary MCLs, for these substances in cases where the water has the designated beneficial use of municipal and domestic supply. Where taste and odor thresholds have not been promulgated as SMCLs, the Regional Water Board uses available technical literature and other sources of information for determining the appropriate numeric standard that complies with the taste and odor objective. (See Issue 14, Application of water quality objectives.)

In an August 20, 1991 memorandum to all Department of Toxic Substances Control (DTSC) toxicologists regarding *Health Risk Criteria for Use in Risk Assessments Prepared for or by DTSC*, Mr. Jeffrey J. Wong, Ph.D., Chief, Toxicology and Risk Assessment Section, DTSC, acknowledges that MCLs are only part of the hierarchy of health risk criteria that should be used to estimate health risks.

This alternative would provide consistency with existing federal standards and clarification with respect to the existing water quality objectives; therefore, attainability is not in question and no environmental or economic consequences are anticipated.

Issue 8: Clarify the Surface Water Quality Objective for Toxicity - Additional Sources of Information (page III-10)

The existing Basin Plan (Chapter III) contains the narrative toxicity objective "All water shall be maintained free of toxic substances in concentrations that produce detrimental physiological responses in human, plant, or aquatic life". The Basin Plan goes on to say, "Compliance with this objective will be determined by analyses of indicator organisms, species diversity, population density, growth anomalies, and biotoxicity tests of appropriate duration or other methods as specified by the Regional [Water] Board". The Basin Plan also cites various organizations that develop criteria that the Regional Water Board refers to when determining compliance with this narrative objective, including the State Water Board, the U.S. Food and Drug Administration, the National Academy of Sciences, the USEPA, and "other organizations".

The list of references in this section of the proposed Basin Plan has been updated to include, "all material and relevant information submitted by the discharger and other interested parties", the California Office of Environmental Health Hazard Assessment (which publishes Proposition 65 regulatory criteria for carcinogens and reproductive toxins), and the California Department of Health Services (which publishes drinking water standards and action levels). This updated list gives a more complete description of the references most commonly used by the Regional Water Board when evaluating compliance with the toxicity objective and clarifies what is meant by "other organizations".

In addition, some agencies call their numerical limits "criteria", while others refer to them as "guidelines". Therefore, the term "guidelines" is included in the proposed Basin

Plan, along with the existing word "criteria". The terms are virtually synonymous, as they refer to non-regulatory indicators of toxicity.

The changes in the Basin Plan language that are described above clarify existing regulation. Therefore, there are no known adverse environmental or economic impacts that would result from the proposed new language. The proposed new language is consistent with the proposed "Policy for Application of Water Quality Objectives" (see Issue 14).

Issue 9: Clarify the Surface Water Quality Objective for Toxicity - Toxicologic Interaction (page III-10)

Present Policy

The existing Basin Plan contains the following narrative toxicity objective: "All water shall be maintained free of toxic substances in concentrations that produce detrimental physiological responses in human, plant, or aquatic life. Compliance with this objective will be determined by analyses of indicator organisms, species diversity, population density, growth anomalies, and biotoxicity tests of appropriate duration or other methods as specified by the Regional [Water] Board." The Basin Plan also cites various references that are referred to in determining compliance with this narrative objective.

Issue Description

As stated above, the existing Basin Plan includes the objective that "all waters shall be maintained free of toxic substances in concentrations that produce detrimental physiological responses in human, plant, animal or aquatic life". Toxicity is prohibited, regardless of whether one chemical or a group of chemicals is responsible for the toxicity. However, there has been some confusion over how the Regional Water Board makes toxicity determinations when combinations of toxic chemicals are present in water.

The term "toxicologic interaction " refers to the toxicologic effect of the exposure of an organism to two or more toxic chemicals. Possible toxicologic interactions may be grouped into three types—synergism, additivity, and antagonism. Usually, the effect of two toxic chemicals is the summation of the individual responses to each chemical. This situation is known as "additivity," since the toxic effects of each chemical are simply added to determine the overall toxic effect. Synergism is where the combined effect is greater than the summation of the individual responses to each chemical. An example of synergism is the cancer risk from the combination of asbestos exposure and smoking. Antagonism is where the combined effect is less than the summation of the individual responses to each chemical. Unfortunately, sufficient information is often not available on toxicologic interaction to be able to predict whether the result of the exposure to multiple toxic chemicals will be synergistic or antagonistic.

The existing Basin Plan necessarily considers toxicologic interactions through direct measurement of toxicity to organisms, but is silent on how criteria and guidelines may be used to predict those toxicologic interactions.

Alternatives

Two types of options were evaluated: 1) no change and 2) adding language to clarify how the Regional Water Board makes determinations when combinations of toxic chemicals are present in water. In addition to the "No Action" alternative, two alternative choices are presented for clarifying language.

1. NO ACTION. Under this alternative, the narrative objective for toxicity would continue to be used with no clear interpretation of how to protect beneficial uses from combinations of chemicals in the absence of direct measurements on test organisms, aquatic life, wildlife, plants or humans. This would result in inconsistent interpretation and application of the objective. This could lead to inadequate protection, or delay in protection until toxicity is actually manifested in populations of organisms that beneficially use water.

2. CLARIFY HOW INTERACTIVE TOXICOLOGICAL EFFECTS ARE EVALUATED BY ASSUMING ADDITIVITY FOR ALL POLLUTANTS. Under this alternative, the Regional Water Board would assume additivity for all pollutants. This would be protective of beneficial uses and would clearly tell the regulated community and public how the Regional Water Board will address multiple toxicants in water. However, this alternative would probably be over protective in many cases, since it is unlikely that all constituents are strictly additive. Implementation of this alternative could result in excessive expenditures by dischargers to meet receiving water limits that are unnecessarily stringent.

3. CLARIFY HOW INTERACTIVE TOXICOLOGICAL EFFECTS ARE EVALUATED BY ASSUMING ADDITIVITY FOR SPECIFIC POLLUTANTS. Under this alternative, the Regional Water Board would, in the absence of scientifically valid evidence to the contrary, assume additivity for pollutants which are carcinogens or which manifest their toxic effect through similar mechanisms (e.g., they affect the same organ system).

   This alternative would eliminate the existing ambiguity regarding how the Regional Water Board interprets and implements the surface water quality objective for toxicity. It would provide for more consistent implementation and eliminate the potential for strict consideration of all chemical effects to be additive.

Staff Recommendation

Adopt alternative 3. Under this alternative, the Regional Water Board would, in the absence of scientifically valid evidence to the contrary, assume additivity for pollutants which are carcinogens or which manifest their toxic effect through similar mechanisms. This alternative provides reasonable protection of beneficial uses and is a reasonable application of the narrative toxicity objective that has existed in the Basin Plan since 1975. This alternative allows for clear action by the Regional Water Board based on chemical concentration data without the need to wait for toxicity to manifest itself in organism populations. A standard toxicologic additivity equation to determine the additive risk of multiple toxic substances is also proposed to be added to the Implementation section of the Basin Plan (see Issue 14).

Alternative 3 is consistent with the way the narrative objective has been historically interpreted and it clarifies the existing objective. The existing Basin Plan includes the objective that "all waters shall be maintained free of toxic substances in concentrations that produce detrimental physiological responses in human, plant, animal or aquatic life". Thus, the Basin Plan already requires that surface waters be nontoxic, regardless of whether one or a group of constituents are responsible for the toxicity. The proposed Basin Plan language about additivity merely clarifies the existing requirement. It allows the Regional Water Board to make judgments about which constituents are additive (based on existing sources of information) whenever the Regional Water Board makes a decision that could affect surface water (e.g., adopt waste discharge requirements). It also allows dischargers and other interested parties the opportunity to present information regarding the toxicologic interaction of constituents.

The proposed Basin Plan language is consistent with regulations in Title 23, California Code of Regulations (CCR), Section 2550.4(g) and Title 22, CCR, Section 66264.94(f) for determining cleanup levels greater than background, and with guidance materials provided both by USEPA under the CERCLA Program [*Risk Assessment & Guidance for Superfund (RAGS)* , Volume I, Human Health Evaluation Manual, Part A-1989 and Part B-1991] and by the Department of Toxic Substances Control for hazardous site risk assessment [*Cal TOX: A Multimedia Total Exposure Model For Hazardous Waste Sites*, December 1993 and *Preliminary Endangerment Assessment Guidance Manual*, January 1994]. It is also consistent with the existing additivity provisions contained in the implementation program for pesticides, described in Chapter 4 of the existing Basin Plan (Page IV-36).

The existing Basin Plan already requires waters to be free of pollutants or chemicals in amounts that are toxic. The proposed language on additivity does not impose any additional regulatory requirement. In considering economics, it should be noted that there may be costs associated with this objective. Since the objective has broad and general applicability, it is not feasible to perform a meaningful economic analysis of its impacts at this time. To implement this Basin Plan language, the Regional Water Board

will weigh economic considerations along with other factors in adopting enforcement orders and waste discharge requirements for individual discharges. One potential expense to a discharger might be if they choose to prepare information to submit to the Regional Water Board regarding the toxicologic interactive properties of chemicals. This would be a factor only if the discharger does not agree with the Regional Water Board's determinations on what is additive. The cost of preparing this information is unknown since it is up to the discharger to determine what level of response is appropriate, if any. However, there will be no additional costs in the event that the discharger can prove no toxicity exists. If the discharger is unable to prove to the Regional Water Board that additive toxicity does not exist, there will also be costs associated with treatment processes, etc., that must be performed to reduce the levels of constituents to a point where they are no longer toxic. The economic benefits of avoiding the costs of failing to recognize and compensate for toxicological interaction are also unknown, but may be quite substantial in some instances (e.g., fish kills, loss of biodiversity, loss of economically important aquatic life, and loss of drinking water supplies).

In summary, the proposed language on additivity clarifies existing Basin Plan language, and does not add an additional regulatory or significant economic burden to dischargers. There are no adverse environmental impacts that would result from this action.

Issue 10: Add turbidity objective for surface waters with natural turbidity less than 5 NTUs (Chapter III, page III-10)

Present Policy

The existing Basin Plan contains the following general turbidity objectives, in addition to objectives for specific water bodies: "Waters shall be free of changes in turbidity that cause nuisance or adversely affect beneficial uses. Increases in turbidity attributable to controllable water quality factors shall not exceed the following limits:

- Where natural turbidity is between 0 and 50 Nephelometric Turbidity Units (NTUs), increases shall not exceed 20 percent.
- Where natural turbidity is between 50 and 100 NTUs, increases shall not exceed 10 NTUs.
- Where natural turbidity is greater than 100 NTUs, increases shall not exceed 10 percent."

Issue Description

Turbidity is caused by suspended materials which interfere with the passage of light through water. Because of the wide variety of materials which cause turbidity, an

arbitrary standard of 1 milligram of silicate clay per liter of water is defined as one unit of turbidity.

Staff is not aware of any significant water quality problems associated with an increase of 1 NTU in surface waters in the lower turbidity range (natural turbidities between 0 and 5 NTUs). However, the difference between allowing an increase of 1 NTU and an increase of 20 percent over background may be significant in terms of cost when treating wastewater. Retaining the stringent limit when there is no known water quality benefit could result in reduction of discharges of good quality wastewaters into natural channels. Because of the climate in the Region and the control of natural stream flows, increasing flows in the natural channels would be a benefit to aquatic resources and, thus, to the people of the state. In cases of effluent dominated streams, aquatic resources may depend on the effluent flow for survival.

Alternatives

1. NO ACTION. Under this alternative the existing objective would apply: where natural turbidity is between 0 and 50 NTUs, increases shall not exceed 20 percent. Staff is not aware of any adverse impact on beneficial uses of water in the lower ranges (0 to 5 NTUs) with small changes in turbidity. However, when the waste discharge is of good quality, it may be used to increase the flow of waters in natural channels and thus increase the water quality benefits for aquatic life. Retaining the current objective, which limits increases to 20 percent, would prohibit almost all discharges to these surface waters because of excessive treatment costs.

2. ALLOW TURBIDITY TO INCREASE BY 1 NTU IN WATERS WITH NATURAL TURBIDITIES LESS THAN 5 NTUS. Under this alternative the objective for turbidity increases in waters where natural turbidity is between 0 and 5 NTUs would be 1 NTU. The objective for turbidity increases in waters where natural turbidity is between 5 and 50 NTUs would be 20 percent. Staff is not aware of any adverse impact on beneficial uses of water with small changes in turbidity in the lower ranges (0 to 5 NTUs). Waste discharges that increase natural turbidity by just 1 NTU are of good quality. It would be beneficial in this case to allow the discharge to increase the flows in the natural channel. This would benefit the aquatic resources of the channel and thus benefit the people of the state.

Staff Recommendation

Adopt Alternative 2. Alternative 1 was rejected because it is unnecessarily stringent. It can be cost prohibitive to treat effluent to a level where it will only increase the turbidity of the receiving water a fraction of an NTU, which is the case for receiving waters in the lower turbidity range (0 to 5 NTUs). In those cases, a valuable resource is needlessly going to waste, since discharges that increase natural turbidity by just 1 NTU are still of good quality. Alternative 2 allows a more reasonable approach in terms of treatment

costs. Staff does not have any information to show that a change of 1 NTU in the 0 to 5 NTU turbidity range has any significant adverse impact on beneficial uses or the environment. It would be a benefit to the people of the state and the environment to be able to maintain flows in natural channels, especially effluent dominated streams that would otherwise go dry during certain times of the year.

Staff proposes the following Basin Plan language:

> "Waters shall be free of changes in turbidity that cause nuisance or adversely affect beneficial uses. Increases in turbidity attributable to controllable water quality factors shall not exceed the following limits:
>
> - Where natural turbidity is between 0 and 5 Nephelometric Turbidity Units (NTUs), increases shall not exceed 1 NTU.
>
> - Where natural turbidity is between 5 and 50 Nephelometric Turbidity Units (NTUs), increases shall not exceed 20 percent.
>
> - Where natural turbidity is between 50 and 100 NTUs, increases shall not exceed 10 NTUs.
>
> - Where natural turbidity is greater than 100 NTUs, increases shall not exceed 10 percent.
>
> In determining compliance with the above limits, appropriate averaging periods may be applied provided that beneficial uses will be fully protected."

The statement regarding and appropriate averaging periods was added for clarity. Averaging periods are currently allowed under the existing Basin Plan.

Potential environmental impacts are discussed following the CEQA checklist (see Appendix 1). In considering economics, it should be noted that the new language would result in cost savings, because it would eliminate unnecessary treatment costs, to dischargers proposing to discharge into streams with a natural turbidity between 0 and 5 NTUs.

Issue 11: Clarify the ground water quality objective for chemical constituents with respect to toxic constituents (Chapter III, page III-11)

Present Policy

The water quality objectives specified in the existing Basin Plan that apply to all ground waters of the Sacramento and San Joaquin River Basins are set forth under the

categories of bacteria, chemical constituents, radioactivity, and tastes and odors. A numerical objective is specified for bacteria, and the narrative objectives for chemical constituents and Radioactivity include a reference to MCLs from Title 22 of the California Code of Regulations (CCR), Division 4, Chapter 15, as water quality limits. General narrative objectives prohibit chemical constituents and radionuclides in concentrations that can adversely affect any designated beneficial use, and prohibit taste or odor-producing substances that cause nuisance or could adversely affect beneficial uses. These objectives describe limits to protect designated beneficial uses of ground water.

Issue Description

As indicated previously in discussing the need to expand ground water beneficial use designations (see Issue 6), ground water resources in the Region have recently come under increasing demands and impacts. The importance of ensuring adequate water quality, as well as quantity, in protecting the sources of usable ground water throughout the Region is now being greatly emphasized.

The Regional Water Board has identified over 7000 sites throughout the Region with confirmed releases of toxic and other deleterious substances which have adversely impacted or threaten to impact the quality of ground water resources. Sources of pollution at these sites include, but are not limited to: leaking underground storage tanks and sumps; leaking above ground tanks; leaking pipelines; leaking waste management units, such as landfills, disposal pits, trenches and ponds; surface spills from chemical handling, transfer or storage; poor housekeeping; and illegal disposal. These sources of pollution can represent both existing and potential toxic and carcinogenic threats to humans, plants, animals, or aquatic life. Some of the important toxic pollutants from these sources include benzene, TCE, PCE, pesticides such as DBCP, and heavy metals, such as arsenic and chromium.

The current water quality objectives for ground water were set forth as part of the Basin Plan when it was first adopted in 1975. These objectives were not updated in 1989, when the existing Basin Plan was published. Since 1975, it has become imperative that these water quality objectives be more adequately designed to ensure that ground water remain of a quality suitable for its existing and potential beneficial uses. As presented, the existing ground water objectives lack clarity and comprehensiveness with respect to toxicity.

The beneficial uses of ground waters threatened and impacted by toxic substances are already protected in the existing Basin Plan pursuant to the water quality objective for Chemical Constituents, which states, in part, that "[g]round waters shall not contain chemical constituents in concentrations that adversely affect beneficial uses." However, the Basin Plan language should be more specific to ensure adequate protection against toxic effects. The existing Basin Plan does not include a ground water quality objective

for toxicity and it provides no specific interpretation of how beneficial uses are protected from combinations of toxic chemicals present in water. Without a toxicity objective that accounts for combined toxicity, adequate protection from toxic substances and carcinogens is not clearly provided.

Alternatives

1. NO ACTION. No action would continue use of the existing approach to protecting ground water from toxicity which is not clear. As previously indicated, adequate protection of usable ground water resources from the effects of toxic substances may not be clearly provided by the existing water quality objective for Chemical Constituents.

2. CLARIFY THE GROUND WATER QUALITY OBJECTIVE FOR CHEMICAL CONSTITUENTS BY ADDING A SPECIFIC OBJECTIVE FOR TOXICITY AND ASSUMING ADDITIVITY FOR ALL POLLUTANTS. Under this alternative, the Chemical Constituent objective for ground water would be clarified by adding a ground water quality objective for toxicity, including language to address toxicologic interactive effects. The Regional Water Board would assume additivity for all pollutants. This would be protective of beneficial uses and would clearly tell the regulated community and public how the Regional Water Board will address multiple toxicants in water. However, this alternative would probably be over protective in many cases, since it is unlikely that all constituents are strictly additive. Implementation of this alternative could result in excessive expenditures by dischargers to meet receiving water limits that are unreasonably stringent.

3. CLARIFY THE GROUND WATER QUALITY OBJECTIVE FOR CHEMICAL CONSTITUENTS BY ADDING A SPECIFIC OBJECTIVE FOR TOXICITY AND ASSUMING ADDITIVITY FOR SPECIFIC POLLUTANTS. Under this alternative, the Chemical Constituent objective for ground water would be clarified by adding a ground water quality objective for toxicity, including language to address toxicologic interactive effects. The Regional Water Board would, in the absence of scientifically valid evidence to the contrary, assume additivity for pollutants which are carcinogens or which manifest their toxic effect through similar mechanisms (e.g., they affect the same organ system).

   This approach would address the ambiguities associated with the Chemical Constituent objective by identifying that information regarding toxicity and interactive toxicologic effects may be considered by the Regional Water Board in protecting the beneficial uses of ground water. It would eliminate the potential for strict consideration of all chemical effects to be additive.

Staff Recommendation

Adopt Alternative 3. This Region is significantly limited by the availability and quality of its ground water resources. Improper waste management practices and contaminated sites pose significant threats to the quality of the usable ground water resources. In order to adequately protect the beneficial uses of ground water and prevent conditions of nuisance associated with these resources, the existing water quality objectives must be updated and made more clear, comprehensive, and effective with respect to toxicity.

A water quality objective for toxicity is needed to more clearly provide adequate protection of beneficial uses of ground waters from toxic substances, including carcinogens. This objective essentially clarifies the current approach to applying the existing narrative ground water objective for Chemical Constituents in cases where either no MCL is available or the MCL is not sufficiently limiting to protect beneficial uses (see Issue 7). Toxicity in ground water is a concern when beneficial uses involve exposure of organisms to ground water, including exposure of humans for MUN waters, exposure of crops and livestock for agricultural supply waters, and exposure of aquatic life and wildlife for ground waters that replenish surface waters. This objective more clearly indicates that protection must be provided in cases where organisms are involved in the beneficial use. For example, in cases where Agricultural Supply has been designated as a beneficial use, the consideration of toxicity criteria for plant life protection, which are more stringent than MCLs for certain constituents and parameters, is required in order to protect the beneficial use. Toxicity criteria for certain constituents and parameters are also more stringent than MCLs for aquatic life protection. Consideration of these criteria are necessary to protect the beneficial use designated for surface waters in cases where ground waters are hydraulically connected to surface waters that support habitats suitable for aquatic organisms and wildlife.

Where multiple toxic pollutants exist together in water, toxic effects can only be prevented by acknowledgment of toxicologic interactions. In the absence of scientifically valid evidence to the contrary, pollutants which are carcinogens or which manifest their toxic effects through similar mechanisms must be considered by the Board to have additive toxicity in order to provide adequate protection from detrimental affects associated with beneficial uses (see Issue 9). These additive considerations are also currently provided for pursuant to the existing Chemical Constituent water quality objective for ground water.

The toxicity objective for ground water clarifies existing requirements and is set forth in a manner similar to the existing and proposed additions to the toxicity objective for surface waters of the Region. As such, this objective provides for protecting beneficial uses of ground water in a manner consistent with existing Basin Plan requirements for both surface and ground waters. As a result, attainability is not in question and this alternative has no new environmental or economic consequences.

The existing Basin Plan already requires waters to be free of pollutants or chemicals in amounts that are toxic. The proposed language on additivity does not impose any additional regulatory requirement. In considering economics, it should be noted that there may be costs associated with this objective. Since the objective has broad and general applicability, it is not feasible to perform a meaningful economic analysis of its impacts at this time. To implement this Basin Plan language, the Regional Water Board will weigh economic considerations along with other factors in adopting enforcement orders and waste discharge requirements for individual discharges. One potential expense to a discharger might be if they choose to prepare information to submit to the Regional Water Board regarding the toxicologic interactive properties of chemicals. This would be a factor only if the discharger does not agree with the Regional Water Board's determinations on what is additive. The cost of preparing this information is unknown since it is up to the discharger to determine what level of response is appropriate, if any. However, there will be no additional costs in the event that the discharger can prove no toxicity exists. If the discharger is unable to prove to the Regional Water Board that toxicity does not exist, there will also be costs associated with treatment processes, etc., reduce the levels of constituents to a point where they are no longer toxic.

Issue 12: Expand the Disposal of Wastewater on Land Policy and further clarify implementation of Water Reclamation Policy (Chapter IV - Policy #2 Wastewater Reuse Policy, page IV-17.)

Present Policy

The existing Basin Plan incorporates State Water Board Resolution No. 77-1, Statement of Policy with respect to Water Reclamation in California, by reference. It is Appendix Item 5 and is discussed as part of the section entitled "Nature of Control Actions Implemented by the Regional Board". As discussed in the existing Basin Plan, Resolution No. 77-1 requires the Regional Water Board to conduct water reclamation surveys and specifies reclamation actions to be implemented by the Regional Board. This resolution directs the Regional Water Board to encourage the reclamation and reuse of water in the region. In implementing Resolution No. 77-1, The Regional Water Board adopted a policy entitled "Disposal of Wastewater on Land Policy" as part of the existing Basin Plan. Pursuant to this policy, the Regional Water Board encourages the disposal of wastewaters on land where practicable, and requires applicants for waste discharge requirements and discharge permits to evaluate land disposal as an alternative.

Issue Description

The existing Basin Plan does not address how the Regional Water Board implements Resolution No. 77-1 to encourage the reuse of wastewater other than for land disposal. As stated in Resolution 77-1, "The California Legislature has declared that the State shall undertake all possible steps to encourage the development of water reclamation

facilities so that reclaimed water may be made available to help meet the growing water requirements of the State." A document entitled "Policy and Action Plan for Water Reclamation in California," dated December 1976, is also referred to in Resolution No. 77-1. This document recommends a variety of actions to encourage the development of water reclamation facilities and the use of reclaimed water. However, it is not clear how the Regional Water Board applies these water reclamation principles when issuing a permit, or in an equivalent process, other than to authorize the disposal of wastewaters on land where practicable. As a result, the existing Basin Plan lacks the specificity necessary to ensure proper and consistent implementation of the principles of Resolution 77-1. In addition, this lack of clarity can result in unnecessary delay in permitting processes because information necessary to be consistent with the requirements of Resolution 77-1 may not be provided to the Regional Water Board.

Alternatives

1. NO ACTION. The policy entitled "Disposal of Wastewater on Land Policy" would continue to present a limited approach to implementing Resolution No. 77-1 in the Basin Plan. As previously indicated, the Regional Water Board's approach to water reclamation and reuse in this policy, as currently set forth in the Basin Plan, is not adequate.

2. EXPAND THE POLICY ENTITLED "DISPOSAL OF WASTEWATER ON LAND POLICY." This alternative would modify the "Disposal of Wastewater on Land Policy" by adopting a new title and language to further clarify the principles of Resolution No. 77-1 as part of the Basin Plan. The policy would be entitled "Wastewater Reuse Policy." The policy would be expanded to require applicants for waste discharge requirements and discharge permits to evaluate wastewater reuse options in addition to land disposal, as appropriate. Dischargers would also be required to evaluate how options for wastewater reuse can be optimized. This expanded policy would provide a more comprehensive basis for understanding and implementing the Regional Water Board's existing approach to encouraging water reuse pursuant to the mandate of Resolution No. 77-1.

Staff Recommendation

Adopt Alternative 2. Staff recommends this alternative as necessary to ensure proper interpretation and application of Resolution No. 77-1. Basin Plan requirements must be more consistent with, and clarify, the principles described in Resolution No. 77-1 to effectively encourage water reclamation in the Region.

This alternative would clarify procedures and requirements used and implemented by the Regional Board pursuant to the existing basin plan; therefore, attainability is not in question and this alternative would not result in any new environmental or economic consequences. Potential environmental impacts are discussed following the CEQA checklist (see Appendix 1).

Issue 13: Clarify implementation of antidegradation policy (Chapter IV - Policy #6. Antidegradation Implementation Policy, page IV-18)

Present Policy

The existing Basin Plan incorporates State Water Board Resolution No. 68-16, "Statement of Policy with Respect to Maintaining High Quality of Waters of California" (Antidegradation Policy) by reference. It is Appendix Item 1 and is discussed as part of the section entitled "Nature of Control Actions Implemented by the Regional Board." In 1968, the State Water Board adopted Resolution No. 68-16 under the Dickey Water Pollution Control Act (Dickey Act) and intended it to be part of the state's water quality standards submittal under the Water Quality Act of 1965, Pub. L. No. 89-234, 79 Stat. 903. See generally Environmental Law Institute, Federal Environmental Law 715-19 (1974); 47 Ops.Cal.Atty.Gen. 135 (1966). The State Water Board at that time established water quality standards by setting objectives in state policy for water quality control. 44 Ops.Cal.Atty.Gen. 126 (1964). As discussed in the existing Basin Plan, Resolution No. 68-16 generally restricts the Regional Water Board and dischargers from reducing the water quality of surface and ground waters even though such a reduction in water quality might still allow the protection of the beneficial uses associated with the water prior to the quality reduction. Pursuant to Resolution 68-16, in regulating discharges to waters of the state, Regional Boards should not allow degradation of water quality unless such degradation would be consistent with the maximum benefit to the people of the state, protects all beneficial uses, and applies best practicable treatment or control. This policy to maintain existing high quality water was reaffirmed by the State Board in 1987 and has not been superseded by any other policies of the State Water Board.

Issue Description

The existing Basin Plan does not directly address how the Regional Water Board implements Resolution No. 68-16. In particular, it is not clear how the Regional Water Board applies the mandate to maintain high quality waters when issuing a permit, or in an equivalent process, to authorize a discharge which may affect the quality of waters within the region. As a result, the existing Basin Plan lacks the specificity necessary to ensure compliance with, and consistent application of, Resolution 68-16. The lack of clarity can also result in unnecessary delay in permitting processes because insufficient information may be provided to the Regional Water Board.

Alternatives

1. NO ACTION. Resolution No. 68-16 would continue to be incorporated by the existing references in the Basin Plan. As previously indicated, the Regional Water Board's approach to implementing this policy, as currently set forth in the Basin Plan, is not clear. This alternative would continue the existing potential for

inconsistent interpretation and application of Resolution 68-16. This could result in overregulation in some cases and inadequate protection of water quality in others, pursuant to this policy. The potential for unnecessary delay as part of permitting processes would also remain high.

2. ADOPT A NEW POLICY TO CLARIFY HOW RESOLUTION NO. 68-16 IS IMPLEMENTED BY THE REGIONAL WATER BOARD IN ISSUING A PERMIT, OR AN EQUIVALENT PROCESS, REGARDING ANY DISCHARGE OF WASTE WHICH MAY AFFECT THE QUALITY OF SURFACE OR GROUND WATER IN THE REGION. This alternative would set forth a new policy entitled "Antidegradation Implementation Policy" as part of the Basin Plan. The policy would include a discussion of the information necessary, including factors which must be considered, in making a determination regarding a discharge, or a potential discharge, which may degrade the quality of waters of the Region. This policy would provide a clear and consistent basis for understanding the Regional Water Board's existing approach to protecting these waters pursuant to the mandate of Resolution No. 68-16.

Staff Recommendation

Adopt Alternative 2. Staff recommends this alternative as the most effective, reasonable, and necessary method to eliminate ambiguity, and to ensure proper protection of water quality, regarding the implementation of Resolution No. 68-16. This ambiguity could result in incorrect application or interpretation of Basin Plan requirements. Pursuant to Resolution No. 68-16, the Regional Water Board should make specific findings in authorizing any discharge which may affect water quality in the region. Therefore, it is the responsibility of the Regional Board to make decisions regarding the nature of a discharge, or potential discharge, which may have an adverse affect on water quality.

Both regional and site-specific conditions must be considered in any decision affecting resources that are locally important. The State Water Board has interpreted Resolution No. 68-16 to incorporate the federal antidegradation policy in order to ensure consistency with federal Clean Water Act requirements. See State Water Board Order No. 86-17 (Fay) at 17-18. USEPA concurred with the State Water Board's interpretation. See memorandum from William R. Attwater to All Regional Board Executive Officers, 7 October 1987, p.2, "Anti-degradation Policy". Application of Resolution No. 68-16 and the federal antidegradation policy hinge on the specific facts of the situation. It is not possible to provide a definitive answer as to what numeric standard is appropriate regarding a discharge without site-specific information. Nonetheless, the Regional Board must strive for consistency in *procedures* for authorizing discharges to waters of the region in order to avoid inequitable results.

Resolution No. 68-16 requires, in part, that any activity that results in discharges to high quality water must be required to meet "waste discharge requirements which will result in the best practicable treatment or control of the discharge necessary to assure that (a)

pollution or nuisance will not occur and (b) the highest water quality consistent with the maximum benefit to the people of the State will be maintained." However, Resolution No. 68-16 does not define "best practicable treatment or control." To comply with this standard, the Regional Board sets waste discharge requirements at levels that can be achieved using "best efforts" and "reasonable control methods." See, e.g., State Water Board Order No. 82-5 (Chino Basin Municipal Water District). Discharge requirements may be set at more stringent levels than the water quality control plan objectives if they can be met using "best efforts." The "best efforts" approach involves "(a) making a showing that the constituent is in need of control; and (b) establishing limitations which the discharger can be expected to achieve using reasonable control measures." State Water Board Order No. WQ 81-5 (City of Lompoc) at p.6. To determine what are "reasonable control methods" for discharges to ground water, reference to Clean Water Act technology-based standards for discharges to surface water is appropriate. Under the Clean Water Act, point source discharges to surface waters must be treated using best available technology economically achievable (BAT). Point source discharges to ground water must meet the same requirements.

The policy set forth under this alternative would clarify procedures and requirements used and implemented by the Regional Board pursuant to the existing Basin Plan; therefore, attainability is not in question and this alternative would not result in any new environmental or economic consequences. Costs of providing information will continue to vary based on the potential impacts of the discharge to receiving waters. There are no adverse environmental impacts that would result from the proposed clarifications.

Issue 14: Clarify application of water quality objectives (Chapter IV - Policy 7. Policy for Application of Water Quality Objectives, pages IV-18 to IV-20)

Present Policy

The Porter-Cologne Act requires the Regional Water Boards to establish water quality objectives in Basin Plans. Water Code Section 13241. "Water quality objectives" are defined as "the limits or levels of water quality constituents or characteristics which are established for the reasonable protection of beneficial uses of water or the prevention of nuisance within a specific area." Water Code Section 13050(h).

The water quality objectives specified in the existing Basin Plan that apply to surface waters of the Sacramento and San Joaquin River Basins are set forth under the categories of bacteria, biostimulatory substances, chemical constituents, color, dissolved oxygen, floating material, oil and grease, pH, pesticides, radioactivity, salinity, sediment, settleable material, suspended material, tastes and odors, temperature, toxicity, and turbidity. These objectives (numerical, narrative, or both) describe limits to protect designated beneficial uses of surface water. The narrative objectives for Chemical

Constituents and Radioactivity include a reference to MCLs from Title 22 of the California Code of Regulations (CCR), Division 4, Chapter 15, as water quality limits.

The water quality objectives specified in the existing Basin Plan that apply to ground waters of the Sacramento and San Joaquin River Basins, are set forth under the categories of Bacteria, Chemical Constituents, Radioactivity, and Tastes and Odors. A numerical objective is specified for Bacteria, and the narrative objectives for Chemical Constituents and Radioactivity include a reference to MCLs from Title 22 of the California Code of Regulations (CCR), Division 4, Chapter 15, as water quality limits. General narrative objectives prohibit chemical constituents in concentrations that adversely affect agricultural and other beneficial uses, and prohibit taste or odor-producing substances that cause nuisance or could adversely affect beneficial uses. These objectives describe limits to protect designated beneficial uses of ground water.

As previously discussed (see Issue 7), the maintenance of the existing high quality of water (i.e., "background") is the Regional Water Board's initial goal in implementing the antidegradation directives of Section 13000 of the Water Code and State Water Board Resolution No. 68-16 (Antidegradation Policy). "Background" means the concentrations or measures of constituents or parameters in water or soil that has not been affected by the discharge(s) in question. This goal of "background" defines the most stringent limits that the Regional Water Board may require for water quality protection. The water quality objectives specified in the Basin Plan and in other applicable Water Quality Control Plans represent the least stringent limits required for water quality protection.

Issue Description

As presented in the existing Basin Plan, the water quality objectives lack clarity and comprehensiveness. A better understanding of the complete process of applying the water quality objectives is needed. It is not clear in the existing Basin Plan how consistency with existing statutes, policies and procedures is maintained when water quality objectives are applied.

In addition, water quality objectives may be stated in either numerical or narrative form. Where numerical objectives are listed in the existing Basin Plan, their values become the numerical water quality limits for the indicated constituent(s) or parameter(s) to protect beneficial uses of the specified body of water. Thus, the application of numerical objectives is direct and easy to understand. However, some of the important water quality objectives for surface water and most of the current water quality objectives for ground waters are stated in narrative form, including only limited references to numerical criteria. As a result, it is unclear how these objectives are applied by the Regional Water Board.

The lack of clarity associated with the existing water quality objectives is particularly evident in cases where State or Federal agencies other than the Regional Water Board are involved in interpreting and applying the objectives. For example, in establishing

cleanup levels for ground water contaminated by hazardous chemicals and waste at Department of Defense (DoD) sites throughout the region, the USEPA and DoD interpret the state standards that will be implemented. As the agencies responsible for implementing the provisions of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), and because CERCLA takes precedence at these DoD sites, the USEPA and DoD ultimately determine whether water quality objectives and other state requirements are applicable, or relevant and appropriate requirements (ARARs).

Once this determination is made, the USEPA or DoD will implement a state water quality objective or other state requirement only to the extent that the objective is, or results in, more stringent limits than included in any federal ARAR criteria. Negotiations with the USEPA and DoD regarding the applicability and stringency of the water quality objectives for ground water have been complicated and difficult as a result of the lack of explicit identification of the initial "background" goal and the ambiguities associated with implementing the current narrative form of the water quality objectives in the existing basin plan. This process has, and will continue to have, great potential to result in applications of water quality objectives at DoD and CERCLA facilities that are inconsistent with those applied by the Regional Water Board at other sites in the region.

In addition, as discussed in Issue 9, the existing Basin Plan explicitly considers toxicologic interaction through direct measurement of toxicity to organisms, but is silent on how criteria and guidelines may be used to measure or predict toxicologic interactions. Therefore, it is unclear how the Regional Water Board makes determinations when combinations of toxic chemicals are present in water.

Alternatives

1. NO ACTION. No action would continue use of the existing numerical and narrative objectives. As previously indicated, the application of these objectives, as currently set forth, is not clear. This alternative would continue the existing potential for inconsistent interpretation and application of the water quality objectives. This could result in overregulation in some cases and inadequate protection in others.

2. CLARIFY THAT "BACKGROUND " REPRESENTS AN INITIAL GOAL AND ADOPT NUMERICAL WATER QUALITY OBJECTIVES . This alternative would expand the water quality objectives to include language that would describe how the Regional Water Board applies State Water Board Resolution No. 68-16 to maintain "background" water quality conditions, unless some change in water quality is permissible under that policy. This alternative would also replace the narrative water quality objectives with numerical water quality objectives for all constituents and parameters of concern in protecting water quality and all designated beneficial uses.

This alternative would require physical tests (e.g. toxicity, taste and odor) to be conducted on all waters of the Region in order to measure the effects of constituents and parameters on all waters with designated beneficial uses. An effort such as this would not be practical nor practicable to perform. There would be a need to develop numerical objectives for a vast number of constituents and parameters and it may not be feasible to simulate all cases representative of potential actual effects or make accurate predictions of actual effects. Even if all such effects could be adequately simulated or accurately predicted, there are insufficient staff resources available to cover all of the chemicals and parameters that could affect beneficial uses of the waters of the region.

In addition, fixed numerical objectives would leave no flexibility to account for changes in our knowledge of the effects of pollutants or the ability to react to newly discovered pollutants without a formal Basin Plan amendment. Fixed numerical objectives for chemical constituents would also remove the flexibility to account for the combined risks resulting from the presence of multiple chemicals together in a water resource. This would not provide for adequate protection of water quality and designated beneficial uses.

3. ADOPT A POLICY WHICH CLARIFIES THAT "BACKGROUND " REPRESENTS AN INITIAL GOAL AND DESCRIBES HOW THE NUMERICAL LIMITS ARE ESTABLISHED IN IMPLEMENTING THE NARRATIVE WATER QUALITY OBJECTIVES . Under this alternative, a policy entitled "Policy for Application of Water Quality Objectives" would be adopted as part of the Basin Plan to clarify how water quality objectives are implemented and applied. The policy would include language to clarify that water quality objectives apply to all waters within a surface water or ground water resource for which beneficial uses have been designated, rather than at an intake, wellhead or other point of consumption. The policy would also describe how the Regional Water Board applies State Water Board Resolution No. 68-16 to promote the maintenance of "background" water quality conditions, unless some adverse change in water quality is permissible under that resolution. References to numerical criteria and other information would be added to make the process by which numerical limits are determined by the Regional Water Board when applying and evaluating compliance with narrative standards easier to understand. Finally, specific language and a standard additive toxicity formula would be presented to clarify how the Regional Water Board determines appropriate numerical limits in cases where toxic pollutants exist together in water.

This approach would clarify the implementation of Section 13000 of the Water Code, the Antidegradation Policy, and the Chemical Constituent water quality objectives. Further clarification would be provided in evaluating compliance with the current narrative objectives by identifying information that may be considered by the Regional Water Board, including toxicity and interactive toxicologic effects, and numerical criteria developed and/or published by other agencies and organizations (e.g., State Water Board, USEPA, California Department of Health

Services, Cal/EPA's Office of Environmental Health Hazard Assessment, California Department of Toxic Substances Control), and by describing how this information is to be considered.

Because it is impracticable to predict and evaluate beneficial use impacts of all constituents and parameters that can cause pollution but lack numerical water quality objectives, this alternative represents the most effective, inclusive, and reasonable method for clarifying how the narrative objectives are applied using adequate and appropriate criteria. This approach clarifies how the Regional Water Board utilizes readily available and up-to-date information to interpret narrative objectives on a case-by-case basis to protect beneficial uses.

Staff Recommendation

Adopt Alternative 3. Staff recommends this alternative as necessary to ensure a better understanding of how the Regional Water Board promotes the maintenance of existing high quality waters and applies water quality objectives to protect the beneficial uses and prevent conditions of nuisance associated with the water resources in the Region. This alternative presents the most practicable and reasonable approach to clarifying the application of water quality objectives.

Adoption of the proposed policy would provide for more consistent application of water quality objectives within the region and would present the application process in a format that is readily understandable by those affected by it. The policy would describe how consistency with existing statutes, policies and procedures is maintained when water quality objectives are applied.

A statement is included in the policy to clarify that water quality objectives apply to all waters within a surface water or ground water resource for which beneficial uses have been designated, rather than at an intake, wellhead or other point of consumption. This statement is necessary to clarify the existing procedures that are used by the Board in implementing the requirement that "the quality of all waters of the state shall be protected for use and enjoyment by the people of the state." Water Code Section 13000. The term "waters of the state" is defined to mean "any water, surface or underground, including saline waters, within the boundaries of the state." Water Code Section 13050(e). Beneficial uses of surface water take place throughout water bodies. Ground water with existing or potential beneficial uses is also not limited to ground water located in immediate areas of current intake or consumption.

The policy would also describe how the Regional Water Board applies "background" as an initial goal pursuant to State Water Board Resolution No. 68-16. Resolution No. 68-16 requires the maintenance of the existing high quality of water (i.e., "background"), unless a change in water quality "will be consistent with maximum benefit to the people of the State."

In some areas within the Central Valley Region, natural background levels of arsenic, selenium, or boron in ground water exceed MCLs or other numerical water quality limits used by the Board to gauge compliance with applicable water quality objectives. The policy would clarify that in cases where natural background levels of parameters or constituents exceed applicable water quality objectives, the natural background levels are considered to comply with the objectives. In other words, the water quality objectives do not mandate improvement in water quality over natural background conditions.

Ideally, the Regional Water Board would establish numerical water quality objectives for all constituents and parameters of concern. However, the Regional Water Board is limited in its ability and resources to independently establish numerical objectives for all constituents and parameters that have the potential to impact water quality. Furthermore, an effort to measure the effects of all constituents and parameters of concern on beneficial uses would not be practical nor practicable to perform. All cases representative of potential or actual effects cannot necessarily be simulated or predicted. For these reasons, the Regional Water Board must rely on narrative water quality objectives implemented by the application of appropriate numerical limits developed and/or published by other agencies and organizations (e.g., State Water Board, USEPA, California Department of Health Services, Cal/EPA's Office of Environmental Health Hazard Assessment, California Department of Toxic Substances Control) and other relevant information submitted to the Regional Water Board.

Under this alternative, references to numerical criteria and other information would be added to make the process by which numerical limits are determined by the Regional Water Board when evaluating compliance with narrative standards easier to understand. This clarifies the information that is considered by the Regional Water Board when establishing enforceable numerical limits for constituents and parameters which lack numerical water quality objectives. This approach provides for consideration of the most recent and relevant water quality criteria and guidelines to protect a particular beneficial use. Appropriate criteria are updated frequently, some on a regular basis. For example, USEPA health-based water quality limits are updated approximately twice per year. Therefore, compiling the necessary information, and adopting and updating numerical water quality objectives would be both difficult and impractical. As a result, it is necessary to retain narrative objectives to set forth water quality objectives in an optimal and reasonable manner.

For further clarification, and to assist the regulated community and any interested parties in locating numerical criteria used in applying narrative objectives, the policy would also refer to the Regional Water Board's staff report, "A Compilation of Water Quality Goals," as a convenient source of numerical water quality limits from other appropriate agencies and organizations.

This alternative would also provide a specific interpretation of how the Regional Water Board protects water quality and beneficial uses from combinations of toxic chemicals present in water. Without a toxicity objective that explicitly accounts for combined

toxicity, adequate protection from toxic substances and carcinogens is not clearly provided. The proposed language is necessary to clarify that where additive toxicity is determined to be present, concentrations of individual toxic pollutants must be reduced such that additive toxicity is no longer present. The proposed policy presents specific language and a standard additive toxicity formula that is consistent with regulations in Title 23, CCR, Section 2550.4(g), Title 22, CCR, Section 66264.94(f) for determining cleanup levels greater than background, and with guidance materials provided both by USEPA under the CERCLA Program [*Risk Assessment Guidance for Superfund* (RAGS), Volume I Human Health Evaluation Manual, Part A-1989 and Part B-1991] and by the Department of Toxic Substances Control for hazardous site risk assessments [*Cal TOX: A Multimedia Total Exposure Model For Hazardous Waste Sites*, December 1993 and *Preliminary Endangerment Assessment Guidance Manual*, January 1994], and which is already implemented pursuant to the Chemical Constituent water quality objectives and surface water toxicity objective specified in the existing basin plan.

The policy set forth under this alternative would clarify procedures and requirements used and implemented by the Regional Water Board pursuant to the existing Basin Plan; therefore, attainability is not in question and this alternative would not result in any new environmental or economic consequences. There are no adverse environmental impacts that would result from these clarifications.

In considering economics, is should be noted that there are costs associated with the requirements of this policy. For instance, a discharger may not agree with the Regional Water Board's determination that specific pollutants in their discharge have additive toxicity. In that case, dischargers may wish to submit evidence to the Regional Water Board that shows that additive toxicity does not exist. There would then be costs associated with testing, preparation of reports, etc.. In addition, where additive toxicity is determined to be present, there will be costs associated with necessary treatment, possible changes in management practices, etc. that must be performed in order to reduce the concentrations of individual toxic pollutants to a level where additive toxicity is no longer demonstrated.

Issue 15: Clarify the existing strategy designed to ensure adequate investigation and establishment of cleanup levels for ground waters, and for soils which threaten the quality of these waters, at contaminated sites in the Region (Chapter IV - Policy 8, Policy for Investigation and Cleanup of Contaminated Sites, pages IV-20 to IV-23)

Present Policy

The existing Basin Plan does not directly address how the Regional Water Board implements ground water quality objectives when overseeing investigations of contaminated sites in the Region, and establishing cleanup levels for ground waters, and for soils which threaten the quality of these waters. The Regional Water Board oversees investigations and cleanup and abatement actions under the authority of Sections 13000,

13304, and 13267 of the Water Code. It is the responsibility of the Regional Water Board to make decisions regarding cleanup and abatement goals and objectives for the protection of water quality and the beneficial uses of waters of the state within the region. The basis for these decisions include: (1) site-specific characteristics; (2) applicable state and federal statutes and regulations; (3) applicable water quality control plans adopted by the State Water Board and the Regional Water Boards, including beneficial uses, water quality objectives, and implementation plans; (4) State Water Board policies for water quality control, including Resolution No. 68-16, Resolution No. 88-63 and Resolution No. 92-49; (5) relevant standards, criteria, and advisories adopted by other state and federal agencies and organizations.

In 1968, the State Water Board adopted Resolution No. 68-16 ("Statement of Policy with Respect to Maintaining High Quality of Waters in California"). Resolution No. 68-16 provides that Regional Water Boards should not allow degradation of water quality unless such degradation would be consistent with the maximum benefit to the people of the state. This policy to maintain existing high quality water has not been superseded by any other policies of the State Water Board.

The State Water Board adopted Title 23, California Code of Regulations, Section 2510 and following (hereafter referred to as "Chapter 15") pursuant to its broad authority to regulate "[a]ny person discharging waste or proposing to discharge waste within any region that could affect the quality of waters of the state," to require cleanup and abatement of any discharge of waste that threatens water quality, and to adopt regulations that classify wastes and disposal sites in order to "ensure adequate protection of water quality and statewide uniformity in the siting, operation, and closure of waste disposal sites." See Water Code Sections 13260(a)(1), 13304, 13172. Chapter 15, which is entitled "Discharges of Waste to Land," regulates all discharges of waste to land that may affect water quality, unless specifically exempted. Chapter 15 establishes waste and siting classification systems and minimum waste management standards for discharges of waste to land for treatment, storage, and disposal. It also contains corrective action provisions for responding to leaks and other unauthorized discharges, which are intended to maintain background water quality as the goal for corrective action. Title 23, CCR, Section 2550.4(c).

The State Water Board adopted an amended version of Resolution No. 92-49, "Policies and Procedures for Investigation and Cleanup and Abatement of Discharges Under Water Code Section 13304" (Resolution No. 92-49) on April 21, 1994. This policy for water quality control requires that actions for cleanup and abatement "[c]onform to the provisions of Resolution No. 68-16 of the State Water Board and the Water Quality Control Plans of the State and Regional Water Boards", and "[i]mplement the provisions of Chapter 15 that are applicable to cleanup and abatement. This policy contains specific language to "[e]nsure that dischargers are required to clean up and abate the effects of discharges in a manner that promotes attainment of either background water quality, or the best water quality which is reasonable if background levels of water

quality cannot be restored, considering all demands being made and to be made on those waters and the total values involved, beneficial and detrimental, economic and social, tangible and intangible". Any cleanup levels less stringent than background must (1) be established according to the method prescribed in Section 2550.4 of Chapter 15, (2) be "consistent with maximum benefit to the people of the state," (3) "[n]ot unreasonably affect present and anticipated beneficial uses," and (4) "[n]ot result in water quality less than that prescribed in the Water Quality Control Plans and Policies adopted by the State and Regional Water Boards."

Thus, background pollutant concentrations are the initial goal in establishing cleanup levels for water and for contaminated soils which threaten water quality, in accordance with the Water Code, Resolution No. 68-16, Resolution No. 92-49, and applicable provisions of Chapter 15. If attainment of background concentrations is technologically or economically infeasible, cleanup levels must be set as close to background as technologically and economically achievable and must, at a minimum, restore and protect all applicable beneficial uses of waters of the state (as measured by the water quality objectives) and must not pose a substantial present or potential hazard to human health or the environment.

Issue Description

Much of the existing Basin Plan sections regarding ground water policy and procedure were developed in 1975. Minor revisions to these policies were included in the Basin Plan as part of the second edition published in 1989. Since that time, policies, procedures, regulations, and programs for protecting ground water quality have become more extensive and specific in response to findings of extensive pollution of ground water and in response to increasing demands being made and to be made on ground waters in the Region. As a result, the Basin Plan lacks specificity necessary to ensure consistent application and is out-of-date with respect to current Regional Water Board emphasis and policy regarding ground waters.

Within the past decade, the need to restore degraded and polluted ground water resources to provide sufficient availability and adequate quality for existing and potential beneficial uses has become increasingly important. The Regional Water Board has identified over 7000 sites with confirmed releases of constituents of concern which have adversely impacted or threaten to impact ground waters in the Region. Many of these sites contain high concentrations of contaminants in soils which continue to be sources of ground water degradation and pollution. The process of adequately investigating contaminated sites and establishing ground water and soil cleanup levels at these sites is of great importance to the economics and environmental concerns, including water quality control, of the Region.

The existing basin plan is not up-to-date with current practices, nor with policies and regulations set forth by the State and Regional Water Boards, and does not specify any

minimum requirements for overseeing investigations and establishing cleanup levels at contaminated sites in the Region. A cleanup level for ground water must implement all applicable water quality objectives and existing policies for water quality control established by the State Water Board. The lack of clarity in the existing basin plan with respect to the strategy implemented by the Regional Water Board to ensure adequate investigation and establishment of cleanup levels for ground waters, and for soils which threaten the quality of these waters, can result in inconsistent approaches and results at contaminated sites in the Region.

Alternatives

1. NO ACTION. The existing Basin Plan would continue to be out-of-date with existing practices, policies, and regulations set forth by the State and Regional Water Boards for overseeing investigations and establishing cleanup levels for ground waters and soils which threaten the quality of waters of the Region. The lack of consistency and specificity with respect to implementing water quality objectives in accordance with these practices, policies, and regulations would remain. The existing Basin Plan would continue to be unclear regarding the strategy implemented by the Regional Water Board to ensure adequate investigation and establishment of cleanup levels for ground waters, and for soils which threaten the quality of these waters, and the potential for inconsistent approaches and results at contaminated sites in the Region would remain. This alternative could result in lower short-term cleanup costs at some sites. However, water quality would not be adequately protected and the Basin Plan would not conform to State Water Board policies, in violation of Water Code Section 13240.

2. UPDATE REFERENCES TO POLICIES AND REGULATIONS FOR INVESTIGATION AND CLEANUP AND ABATEMENT OF DISCHARGES AND ADOPT ALL GROUND WATER AND SOIL CLEANUP LEVELS AS THE MOST STRINGENT LEVELS. This alternative would include updating the references to policies and regulations adopted by the State and Regional Water Boards for overseeing investigations and establishing cleanup levels for ground waters and soils which threaten the quality of waters of the Region. This alternative would also set forth, in narrative form, a requirement that cleanup levels for all ground waters and soils which threaten the quality of waters of the Region be established at background levels or highest water quality. For the purposes of this alternative, "background" would mean the concentrations or measures of constituents or parameters in the water or soil that has not been affected by the discharge in question.

   The narrative requirement to establish cleanup levels at "background" set forth under this alternative would not be completely consistent with current practice, policies, and regulations, because reasonable flexibility to account for technologic and economic factors in establishing cleanup levels would not be provided. While

this approach may require a less extensive investigation of the nature and extent of contamination problems because cleanup levels would be fixed, such cleanup levels may not be practicable. In many cases, compliance with background levels is not achievable, while compliance with applicable water quality objectives or soil concentrations protective of beneficial uses of ground waters may be possible. In establishing water quality objectives, Water Code Section 13241 acknowledges that it may be possible for the quality of water to be changed to some degree without unreasonably affecting beneficial uses, but technical and economic feasibility, and other factors, must be considered. In addition, the procedures for establishing cleanup levels set forth in the Chapter 15 regulations provide for establishing cleanup levels above background concentrations only after technological and economic achievability is considered. Title 23, CCR, Section 2550.4(c). This method of establishing cleanup levels above background is an explicit and necessary part of the procedures set forth in Resolution No. 92-49.

As a practical matter, cleanup levels should be established on a case-by-case basis because technologic and economic capabilities, and background levels, vary with site- and pollutant-specific factors. These factors are highly variable according to hydrogeologic site conditions and can also often depend on investigative methods and interim remedial measures, such as source removal actions, being conducted properly. Information regarding these factors and other necessary information is derived as a result of comprehensive remedial investigation activities; therefore, cleanup levels would be best established as part of the development and selection of an appropriate corrective action program.

3. UPDATE REFERENCES TO POLICIES AND REGULATIONS FOR INVESTIGATION AND CLEANUP AND ABATEMENT OF DISCHARGES AND ADOPT NUMERICAL CLEANUP LEVELS FOR GROUND WATER AND SOILS THAT ARE APPLICABLE THROUGHOUT THE REGION. This alternative would include updating the references to policies and regulations adopted by the State and Regional Water Boards for overseeing investigations and establishing cleanup levels for ground waters and soils which threaten the quality of waters of the Region. This alternative would also set forth numerical cleanup levels for all ground waters and for soils which threaten the quality of waters of the Region.

This alternative would require that numerical levels be established for a vast number of constituents and parameters. This approach would not be practical nor practicable. There are insufficient staff resources available to be able to cover all chemicals and parameters that could affect water quality and beneficial uses and it would be difficult, if not impossible, to determine appropriate worst case hydrogeologic conditions.

Standardized numerical cleanup levels would not account for site-specific variability. Such cleanup levels would need to be protective of water quality at the most

sensitive of sites (e.g., sites with extremely shallow ground water that is designated for beneficial uses) resulting in levels more stringent than would be necessary to protect and restore water quality at other sites if site-specific conditions were considered. This would result in unnecessary economic burdens.

As discussed under Alternative 2, reasonable flexibility to account for site-specific feasibility of achieving cleanup levels would not be provided. Hydrogeologic conditions vary greatly throughout the Region. The contaminants and chemical mixtures discharged to these environments also vary widely, and the physical and chemical characteristics of contaminants can vary with hydrogeologic conditions. As a result, the environmental fate and transport characteristics of contaminants are unique at each site. Data regarding these characteristics are essential to design a cleanup program that will be appropriate and effective for a site because these characteristics greatly influence: (1) the impacts, and potential impacts of soil contamination to ground water; and (2) the feasibility of achieving various soil and ground water cleanup levels within a range that is protective of water quality and beneficial uses of waters of the State. As a practical matter, it is this site-specific information that the Regional Water Board must use in determining the final cleanup level.

As previously discussed, the procedures for establishing cleanup levels set forth in Chapter 15 and Resolution No. 92-49 require consideration of technologic and economic achievability in setting cleanup levels; therefore, this approach would not be consistent with State Water Board policies or regulations already established for cleanup and abatement of waste discharges.

4. UPDATE REFERENCES TO POLICIES AND REGULATIONS FOR INVESTIGATION AND CLEANUP AND ABATEMENT OF DISCHARGES AND ADOPT A NEW POLICY TO CLARIFY THE EXISTING STRATEGY DESIGNED TO ENSURE ADEQUATE INVESTIGATION AND ESTABLISHMENT OF CLEANUP LEVELS, WHICH INCLUDES ESTABLISHING CLEANUP LEVELS FOR ALL GROUND WATER, AND SOILS WHICH THREATEN THE QUALITY OF THESE WATERS, ON A CASE-BY-CASE BASIS IN THE REGION. This alternative would include updating the references to policies and regulations adopted by the State and Regional Water Boards for overseeing investigations and establishing cleanup levels for ground waters and soils which threaten the quality of waters of the Region. This alternative would also set forth a new policy entitled "Policy for Investigation and Cleanup of Contaminated Sites" to provide a written procedure, including specific factors to be considered and criteria that must be satisfied, which would clarify the Regional Water Board's existing strategy designed to ensure adequate investigation and establishment of cleanup levels for ground waters, and for soils which threaten the quality of these waters, at contaminated sites in the Region. The existing strategy includes implementing ground water quality objectives for the purpose of establishing these cleanup levels on a case-by-case basis.

The factors and criteria included in the new policy would be consistent with provisions of present statutes, regulations and policies for water quality control. The policy would include specific language which provides a clear and comprehensive description of existing practice. The policy is consistent with, and refers to, provisions of the Water Code and the policies and procedures already established by the State Water Board in Resolution No. 68-16, Resolution No. 92-49, and the Chapter 15 regulations. As such, this method of establishing cleanup levels would provide consistency between the various Regional Water Board programs that address site cleanup.

Staff Recommendation

Adopt alternative 4. Staff recommends this alternative as the most effective, appropriate, and reasonable method to ensure proper protection of water quality and beneficial uses when establishing all ground water and soil cleanup levels in the Region.

Paragraph (a), *State Water Board Policy & Regulation*

Water Code Section 13240 requires the Regional Water Board to formulate and adopt a water quality control plan for all areas within the Region. It further requires that this plan (the Basin Plan) conform to the policies set forth in Chapter 1 of the Porter-Cologne Act (commencing with Section 13000) and any state policy for water quality control. Therefore, the existing Basin Plan must include up-to-date references to the policies, procedures, and regulations adopted by the State Water Board for investigation and cleanup and abatement of discharges under Water Code Section 13304.

Furthermore, the Regional Water Board is required to establish water quality objectives and a program of implementation in the Basin Plan to ensure reasonable protection of beneficial uses and the prevention of nuisance. Water Code Sections 13241, 13242(a),(b). Therefore, clear, comprehensive, and up-to-date information regarding the implementation of water quality objectives for cleanup of contaminated sites must be provided in the Basin Plan.

The procedures and requirements presented in the new policy are necessary to reflect existing Regional Water Board practices and to ensure consistency with existing authorities, policies, and procedures that the Regional Water Board uses to oversee investigations and cleanup and abatement actions under Water Code Section 13304. The specific language is also intended to make the existing policies and procedures for establishing both ground water and soil cleanup levels easier to understand by Regional Water Board staff, other agencies, and the public. This will provide for more consistent implementation of these policies and procedures in all cleanup and abatement actions.

As explained under Alternative 3, it is not practical or practicable to establish standard numerical cleanup levels for all constituents and parameters of concern in the Basin Plan

for use throughout the region. Despite the conceptual appeal of this approach, cleanup levels must be established on a case-by-case basis using site-specific data in order to ensure protection of beneficial uses at all sites without being overly restrictive at some less sensitive sites, utilize sufficient technical information, provide adequate flexibility, and provide consistency with applicable statutes, regulations and policies. Even for particular categories of discharges, different cleanup levels which are fully protective of beneficial uses will be appropriate in different site-specific situations.

Both regional and site-specific conditions must be considered in any decision affecting resources that are locally important. The State Water Board has interpreted Resolution No. 68-16 to incorporate the federal antidegradation policy in order to ensure consistency with federal Clean Water Act requirements. See State Water Board Order No. WQ 86-17 (Fay) at 17-18. USEPA concurred with the State Water Board's interpretation. See memorandum from William R. Attwater to All Regional Board Executive Officers, 7 October 1987, p.2, "Anti-degradation Policy". Application of Resolution No. 68-16 and the federal antidegradation policy hinge on the specific facts of the situation. Thus, it is not possible to provide a definitive answer as to what numeric standard is appropriate without site-specific information. Nonetheless, the Regional Water Board must strive for consistency in procedures for setting cleanup levels in order to avoid inequitable results.

The Basin Plan identifies the beneficial uses of waters within the Region and contains the water quality objectives that establish the minimum water quality standards necessary for the protection of the designated uses. Accordingly, at a minimum, the Regional Water Board must ensure that any cleanup and abatement action will promote cleanup levels that will restore, or not allow impairment of, beneficial uses to the extent practicable, as measured by compliance with the water quality objectives.

The Porter-Cologne Act mandates that "activities and factors which may affect the quality of waters of the state shall be regulated to attain the highest water quality which is reasonable... ." Water Code Section 13000. The legislative history of the Porter-Cologne Act indicates that "[c]onservatism in the direction of high quality should guide the establishment of objectives both in water quality control plans and in waste discharge requirements." Recommended Changes in Water Quality Control, Final Report of the Study Panel to the California State Water Resources Control Board, Study Project--Water Quality Control Program (1969) ("Final Report"), p.15. "It is expected that objectives will be tailored on the high quality side of needs of the present and future beneficial uses." Final Report, p.12.

The Regional Water Board is authorized to require the person responsible for a discharge to "clean up the waste or abate the effects thereof... ." Water Code Section 13304. Cleanup of waste contemplates more than abatement of the effects of discharged waste. Cleanup means to remove what was disposed or discharged. Therefore, the

Regional Water Board is authorized to require complete cleanup of all of the discharged waste (i.e., restoration of affected water to conditions that existed before the discharge).

Resolution No. 68-16 is of general applicability to all discharges of waste to waters of the state. In most cleanup cases, some discharge of waste caused the degradation and/or pollution, and Resolution No. 68-16 would apply in relation to that discharge if it occurred after 1968. Actions of the Regional Water Board to establish cleanup levels for contaminated sites are also actions to determine the appropriateness of the discharge that unreasonably degraded water in the first place. In setting ground water cleanup levels, the Regional Water Board considers whether to grant the discharger 's request to allow a certain degree of degradation caused by the discharge to remain. In setting cleanup levels for soils where ground water has not yet been impacted, the Regional Water Board may establish cleanup levels that will prevent degradation of water quality from occurring. In addition, many cleanup actions involve new discharges of treated water into surface waters, onto land where ground waters may be affected, or directly into ground waters. Resolution No. 68-16 also applies to establishment of effluent limits for such new discharges. See Memorandum from William R. Attwater, Chief Counsel of the State Water Board, to Harry M. Schueller, "Application of State Water Board Resolution No. 68-16 . . . to Cleanup of Contaminated Ground Water," February 17, 1994.

As discussed above, the primary corrective action provision of the Chapter 15 regulations was adopted pursuant to not only the State Water Board's specific authority to regulate authorized waste management units, but also to the State Water Board's broad authority under Water Code Section 13304 to require cleanup of any discharge of waste that threatens water quality. The definition of waste management unit in Chapter 15 is very broad, including "an area of land... at which waste is discharged." Title 23, CCR, Section 2601. Therefore, unless specifically exempted, all discharges of waste to land that may affect water quality are regulated by Chapter 15. Section 2511(d) of Chapter 15, which addresses releases of waste to the environment, provides further evidence that Chapter 15 is not limited to discharges of waste to authorized waste management units. See Memorandum from Craig M. Wilson, Assistant Chief Counsel, State Water Board, to James Cornelius, "Applicability of [Chapter 15] to Remedial Actions at National Priority List Sites," February 2, 1994.

Chapter 15 prescribes a methodology for establishing cleanup standards which is set forth to maintain background water quality as the goal for corrective action. Title 23, CCR, Section 2550.4. The Regional Water Board may establish a cleanup level that is greater (less stringent) than the background value of a constituent only if the Board finds that it is technologically or economically infeasible to achieve the background value for that constituent and that the constituent will not pose a substantial present or potential hazard to human health and the environment. Title 23, CCR, Section 2550.4(c). Chapter 15 cleanup requirements do not differentiate between pre- and post-1968 degraded water quality.

Moreover, the State Water Board adopted Resolution No. 92-49, which sets forth procedures for investigation and cleanup and abatement of discharges subject to Water Code Section 13304. This policy for water quality control requires that actions for cleanup and abatement conform to the provisions of Resolution No. 68-16 and implement the provisions of Chapter 15 that are applicable to cleanup and abatement. This policy specifically requires the Regional Water Boards to require dischargers "to clean up and abate the effects of discharges in a manner that promotes attainment of either background water quality, or the best water quality which is reasonable if background levels of water quality cannot be restored... ." Any levels greater than background must be established according to the method prescribed in Chapter 15, Section 2550.4, and other specific factors.

Attainment of the minimum water quality objectives necessary to protect beneficial uses would not be consistent with Water Code Sections 13000 and 13304, Resolution No. 68-16, Resolution No. 92-49, or Chapter 15 if better water quality could be restored by a cleanup and abatement program that is technically and economically feasible. Therefore, the new policy requires dischargers to clean up and abate the effect of discharges in a manner that promotes attainment of background water quality, or the highest water quality which is reasonable if background levels of water quality cannot be restored, not to exceed applicable water quality objectives or concentrations which would pose a significant risk to human health or the environment. For the purposes of the new policy, "background" means the concentrations or measures of constituents or parameters in water or soil that would have existed if the discharge in question had not occurred. This is consistent with the definition contained in Chapter 15. See Title 23, CCR, Section 2601. Application of Resolution No. 68-16, Resolution No. 92-49, and applicable or relevant provisions of the Chapter 15 regulations is explicitly required by Paragraph (a), *State Water Board Policy & Regulation*, of the new policy.

Paragraph (b). *Site Investigation*

In order to be effective, cleanup and remedial activities must be founded on adequate soil and ground water investigations. Each site is unique and the majority of hydrogeologic settings in the Region are complex. The adequacy of a corrective action program hinges, in large part, on the quality and quantity of hydrogeologic data used in designing the program. Therefore, accurate information regarding the nature, magnitude and extent of pollution in a hydrogeologic setting is essential in estimating corrective action design parameters. This information, along with other site-specific and contaminant chemical data, is vitally important in estimating the potential for contaminant migration, which must be factored into the development of an appropriate and effective corrective action system.

If the design of a corrective action system, or remedial activity, is based on incomplete or inaccurate data regarding the impacts, or potential impacts, upon water quality that result from a discharge, the system cannot fulfill its intended purpose, i.e., the system will

likely not be capable of meeting the final goal of cleanup. Such systems may meet acceptable cleanup levels only in the short term or may only serve as a control against further contaminant migration. Thus, the lack of adequate contaminant data can result in a need for additional investigation, modification of existing corrective action systems, or development of new corrective action measures capable of eliminating the impact or threat posed by the discharge. The Regional Water Board has observed that cleanup and abatement actions taken without a prior comprehensive investigation often result in the need for additional work that would not have been required if these actions had been based on an initial sound understanding of site conditions and the nature and extent of the pollution caused by the discharge.

The requirement presented in Paragraph (b) of the new policy is also necessary to be consistent with Resolution No. 92-49 which sets forth specific language that requires the Regional Water Boards to require dischargers to conduct soil and water investigations to determine the source, nature, and horizontal and vertical extent of a discharge, including a preliminary site assessment which must identify affected or threatened waters of the state and their beneficial uses.

Paragraph (b) also provides consistency with the Evaluation Monitoring Program required by Chapter 15, Section 2550.9. This section requires the expeditious delineation of the nature and extent of releases. The discharger is required to collect and analyze all data necessary to assess the nature and extent of the release. The assessment must include a determination of the spacial distribution and concentration of each constituent of concern throughout the zone affected by the release. This information is to be used in the development of adequate and appropriate corrective action measures. In addition, consistency with State Water Board regulations governing underground storage of hazardous substances, which include provisions governing site investigation and corrective action for releases of hazardous substances from underground storage tanks, is provided. See Title 23, CCR, Section 2610 et seq., "Underground Storage Tank Regulations."

As previously discussed, Water Code Section 13304 authorizes the Regional Water Board to require dischargers to clean up waste and abate the effects thereof. If soil or water contamination extends off-site, the discharger must pursue the investigation into these areas so that the effects or threats to water may be fully evaluated and abated. Dischargers may not use the "property line defense" to avoid further investigation of discharges for which they are responsible. This requirement also provides consistency with Resolution No. 92-49, which requires the discharger to extend the investigation, and cleanup and abatement, to any location affected by the discharge or threatened discharge.

Paragraph (c), *Source Removal/Containment*

Removal or containment of the source of contamination is required in order to ensure that water quality is adequately protected from the potential adverse affects of the discharged wastes. Timely implementation of an appropriate source removal or containment action can protect water quality from unnecessary degradation and can prevent or lessen the loss of beneficial uses of affected waters by arresting the release. This approach to protecting water quality is consistent with Chapter 15, Section 2550.10(c), which requires the discharger to take source control action as part of corrective action measures.

In nearly all cases, it is much more cost-effective to prevent pollution than to clean up pollution after it has occurred. If ground water pollution cannot be prevented, taking early source control action can prevent extensive cleanup costs by significantly reducing the levels necessary and/or the time required for ground water cleanup. It is essentially impossible to control contaminant migration and ensure the long-term effectiveness of corrective action programs without significant source control or removal. Furthermore, successful ground water cleanup may never be achieved if these actions are not taken. Contaminants that are discharged to surface soil typically move into the unsaturated zone and may move directly to the water table or they may be partially or fully retained within the unsaturated zone to act as continual sources of ground water degradation and/or pollution. Without removal or containment, chemical constituents remaining in the subsurface will continue to leach. Ongoing leachate resulting from the presence of soil contamination, or other uncontrolled sources, can counteract the effectiveness of ground water treatment systems, exacerbating cleanup efforts.

Paragraph (d), *Cleanup Level Approval*

The Regional Water Board is the principal state agency with primary responsibility for the coordination and control of water quality within its region. Water Code Sections 13001, 13225. Cleanup, abatement, and remedial work is necessary to prevent, or correct conditions of pollution, nuisance, or degradation of waters of the state. Therefore, procedures for establishing soil and ground water cleanup levels within the region are considered by the Regional Water Board to be a strategic part of its program for water quality control. Because cleanup levels are key elements in these processes, they must be approved by the Regional Water Board. However, the Regional Water Board may delegate this effort to its executive officer. Water Code Section 13223.

Paragraph (e), *Site Specificity*

See discussion under Alternatives 2 and 3, above.

Paragraph (f), *Discharger Submittals*

The discharger must provide sufficient technical information to support sound cleanup level selection decisions. See Water Code Section 13267. Paragraph (f) of the new policy describes the information necessary for consideration by the Regional Water Board in making these decisions. These decisions require professional judgments regarding the nature and extent of the environmental problem in relation to the kinds of cleanup technologies which can be considered environmentally protective and effective. Therefore, this information must be focused on plausible concerns and likely remedies presented in the context of cleanup goals.

As required by Resolution No. 92-49, the requested information is consistent with data needed to satisfy regulatory considerations prescribed in Chapter 15, Sections 2550.4 (c) through (g). The level of cleanup that can technologically and economically be achieved will be dictated to a large extent by the impacts, and potential impacts, of the contaminants discharged to the hydrogeologic environment. Therefore, the discharger is required to assess these impacts, and provide the resulting data to the Regional Water Board for review. To form a basis for making resource-protective cleanup level determinations, the information provided must include analyses of all changes, and potential changes, to water quality. All parameters and constituents discharged that are capable of causing adverse impacts on water quality or beneficial uses must be included in these analyses. An assessment of impacts and potential impacts to human health is also necessary to determine health risk based cleanup levels, and to evaluate the need for any immediate actions necessary to protect humans. The complexity of this type of hydrogeologic data presumes a need for written reporting which includes discussions of the analyses that were conducted and the conclusions that were reached. This approach will serve to expedite cleanup decisions and will also provide an evidentiary basis for these decisions, i.e., a record of facts and rationale used in making cleanup decisions.

As discussed above, the Regional Water Board must "[e]nsure that dischargers are required to clean up and abate the effects of discharges in a manner that promotes attainment of either background water quality, or the best water quality which is reasonable if background levels of water quality cannot be restored, considering all demands being made and to be made on those waters and the total values involved, beneficial and detrimental, economic and social, tangible and intangible." Resolution No. 92-49. Any levels greater than background must be established to ensure reasonable protection of beneficial uses and the prevention of nuisance, to the extent practicable, as measured by the water quality objectives. See Water Code Sections 13241 and 13263, and Resolution No. 92-49. To ensure that water quality is not compromised, the Regional Water Board must become familiar with the applicability and relative efficacy of the range of cleanup and abatement strategies available in relation to these cleanup goals. Review of this information will also enable the Regional Water Board to ensure that the dischargers' resources are not wasted on ineffective measures. Chapter 15 requires dischargers to submit an engineering feasibility study that contains a detailed

description of the corrective action measures that could be taken to achieve background concentrations. Title 23, CCR, Section 2550.8(k)(6). This required information is used to determine cleanup levels that are achievable pursuant to Chapter 15, Section 2550.4(e). The proposed requirement specified in Subparagraph (f)(iii) of the new policy is consistent with these regulations.

Paragraphs (g) and (j), *Ground Water and Soil Cleanup Levels*

The provisions in Paragraph (g) of the new policy are set forth to clarify the four basic elements used by the Regional Water Board in establishing cleanup levels for ground water. Additional provisions are set forth to describe how the Board will evaluate the appropriateness of establishing a ground water cleanup level above background concentrations and how the Board will determine such cleanup levels. The provisions in Paragraph (j) of the new policy are set forth to clarify how the Regional Water Board establishes cleanup levels for soils which threaten the quality of water resources in the Region. As previously discussed, these provisions must maintain background water quality, or the best water quality that is reasonable, as the cleanup goal in order to ensure consistency with existing statutes, regulations and policies. See Water Code Sections 13000 and 13304, Title 23, CCR, Section 2550.4, Resolution No. 68-16, and Resolution No. 92-49.

Therefore, the Regional Water Board will establish a cleanup level above a background concentration only if the Regional Water Board determines that it is technologically or economically infeasible to achieve the background concentration. If the Regional Water Board makes such a determination, the Board will then select a cleanup level that is based on the lowest levels which are technically or economically achievable and that will not unreasonably affect present and anticipated beneficial uses of waters of the Region. Decisions involving the issuance of waste discharge requirements and cleanup and abatement orders are subject to public comment, including the public's input on what is reasonable. The proposed provisions of paragraph (g) and (j) are necessary to ensure consistency with the existing statutes, regulations and policies which require technical and economic considerations as part of "reasonable" protection of water quality and beneficial uses. See Water Code Section 13000, Title 23, CCR, Section 2550.4(e), Resolution No. 68-16, and Resolution No. 92-49.

Determinations of technical achievability require a detailed analysis of site-specific conditions in relation to potential cleanup alternatives. In addition to the investigative and water quality assessment data submitted by the discharger, these determinations will generally require the Regional Water Board to review information regarding technologies which are currently being used and are effective, or have been shown to be effective, in reducing concentrations of the constituents of concern under similar conditions. Both design specifications and performance evaluations provide valuable information that should be used to predict how well a technology can accomplish its intended purpose. Therefore, the Regional Water Board will consider performance as

demonstrated by past success or failure of a cleanup technology in evaluating the potential effectiveness of the technology. Where a discharger, through implementation of a particular technology, has been shown to attain a specific discharge limit, the Regional Water Board will determine that the limit is technically achievable. "By definition, current performance is achievable." State Water Board Order No. WQ 90-5 (Citizens for a Better Environment) at p.79.

Resolution No. 68-16 requires, in part, that any activity that results in discharges to high quality water must be required to meet "waste discharge requirements which will result in the best practicable treatment or control of the discharge necessary to assure that (a) pollution or nuisance will not occur and (b) the highest water quality consistent with the maximum benefit to the people of the State will be maintained." The State Water Board has interpreted this to mean that discharge requirements may be set at more stringent levels than the water quality objectives if they can be met using "best efforts." The "best efforts" approach involves "(a) making a showing that the constituent is in need of control; and (b) establishing limitations which the discharger can be expected to achieve using reasonable control measures." State Water Board Order No. WQ 81-5 (City of Lompoc) at p.6. To determine what are "reasonable control methods" for discharges to ground water, reference to Clean Water Act technology-based standards for discharges to surface water is often appropriate. Under the Clean Water Act, point source discharges to surface waters must be treated using best available technology economically achievable (BAT). Clean Water Act Section 301(b), 33 U.S.C. Section 1311(b). Because Resolution 68-16 applies equally to discharges to ground waters and surface waters, BAT requirements may also be considered appropriate for discharges to ground water.

In addition to reviewing information regarding demonstrated and proven cleanup technologies it can be necessary to test these or other potential innovative technologies on the constituents of concern in the hydrogeologic setting, or in a simulated environment. As previously discussed, the efficacy of a cleanup method hinges, in large part, on site-specific conditions. For example, the efficacy of soil vapor extraction systems for removal of volatile organic contaminants from soils depends largely on the moisture content, grain size, and effective porosity of the contaminated soils. Therefore, depending on the complexity of the site and the magnitude of the discharge, it may be necessary for the discharger to conduct small scale demonstrations which simulate or involve on-site conditions (i.e., bench-scale and/or pilot scale studies) in order to provide the data necessary to estimate the degree of success which may be anticipated using particular technologies.

Additional provisions in Paragraph (g) are necessary to clarify how the Regional Water Board will determine economic feasibility. The Regional Water Board must balance the incremental costs of the cleanup with the economic and social costs to the people of the State and to the environment of not achieving the incremental level of cleanup. In determining appropriate cleanup levels, economic feasibility does not refer to the subjective measurement of the ability of the discharger to pay the costs of cleanup, but

rather to the objective measurement of the incremental level of cleanup relative to the cost. The discharger's ability to pay is one factor to be considered in determining whether the cleanup level is reasonable. "Cost savings to the discharger, standing alone, absent a demonstration of how these savings are necessary to accommodate 'important social and economic development' are not adequate justification" for allowing degradation. State Water Board Order No. WQ 86-17 (Fay), pg. 22, n.10 (applying the federal antidegradation policy). With reference to social costs, consideration must be given to whether a lower water quality can be mitigated through reasonable means. In other words, the lower water quality should not result from inadequate treatment facilities or less-than-optimal operation of treatment facilities. Financial and technical resources are primarily considered in establishing schedules for cleanup. Resolution 92-49, State Water Board Order No. WQ 92-09 (Environmental Health Coalition), p.13, n.12. The Regional Water Board has the greatest opportunity to make accommodations for a discharger's financial constraints in its determination of cleanup and abatement schedules because such accommodations need not compromise cleanup goals and objectives.

Paragraph (g) further clarifies that procedures to establish ground water cleanup levels must include considerations of potential additive effects of individual constituents. As previously discussed in Issues 9, 11 and 14, the water quality objectives in the existing Basin Plan require waters to be free of toxic or chemical constituents that adversely affect beneficial uses. Pursuant to these objectives, the Regional Water Board protects water quality and beneficial uses from combinations of toxic chemicals, including carcinogenic constituents, present in water. The proposed provisions in Paragraph (g) are necessary to clarify that the Regional Water Board must consider interactive toxicological effects in a manner consistent with these objectives when establishing ground water cleanup levels. The proposed language is also consistent with Title 23, CCR, Section 2550.4, Title 22, CCR, Section 66264.94(f) for determining cleanup levels greater than background, and with guidance materials provided both by USEPA under the CERCLA Program [*Risk Assessment Guidance for Superfund* (RAGS), Volume I Human Health Evaluation Manual, Part A-1989 and Part B-1991] and by the Department of Toxic Substances Control for hazardous site risk assessments [*Cal TOX: A Multimedia Total Exposure Model For Hazardous Waste Sites*, December 1993 and *Preliminary Endangerment Assessment Guidance Manual*, January 1994]. The proposed provisions also clarify that procedures to evaluate interactive toxicological effects must conform to the toxicological procedures used by appropriately designated agencies to review and evaluate risks to human health and the environment. As a practical matter, the Regional Water Board should avoid duplication of effort with these other agencies when evaluating these types of risk assessments.

Paragraph (h), *Compliance with Ground Water Cleanup Levels*

As specified in the new policy, the requirement proposed in Paragraph (h) is necessary to implement Water Code Sections 13000 and 13241 to ensure protection of potential as

well as existing beneficial uses. This requirement also provides consistency with Resolution No. 92-49, which extends cleanup and abatement to any location affected by the discharge in question, and Section 2550.5(a) of Chapter 15, which specifies that cleanup levels apply immediately downgradient from an authorized waste management unit. Due to its relatively slow movement, lack of mixing or turbulent flow, and generally low biological activity as compared with surface waters, ground water has little or no assimilative capacity. Therefore, the Regional Water Board considers this requirement as necessary to adequately protect ground water quality in the region. In addition, Water Code Section 13263 specifies that the Regional Water Boards, in prescribing requirements, need not authorize the utilization of the full waste assimilation capacities of the receiving waters.

Paragraph (i), *Modification of Ground Water Cleanup Levels*

Paragraph (i) of the new policy is proposed to allow the Regional Water Board to consider modifying ground water cleanup levels that are more stringent than applicable water quality objectives under certain conditions. This approach provides for evaluating compliance with these cleanup levels in a reasonable manner by addressing cases where the appropriate performance of a cleanup program demonstrates that it is not reasonably possible to comply with the levels. The conditions specified in Paragraph (i) are necessary to be consistent with maintaining "background" or the "highest" water quality as a goal in accordance with the procedures and policies implemented in establishing the initial cleanup levels. These conditions also provide the specificity necessary to ensure consistent application of this provision.

Paragraph (k), *Verification of Soil Cleanup*

The provisions proposed in Paragraph (k) of the new policy are necessary to make existing procedures and policies for determining compliance with soil cleanup levels easier to understand. Depending on how compliance with soil cleanup levels is determined, existing or potential future beneficial uses could be lost and ground water resources may not be adequately protected. In many cases, releases to the environment are not visible and so visual inspection will not provide reliable assurance that soil cleanup levels have been met. Compliance often must be evaluated based on accurate measurements of the concentrations of constituents of concern in soil samples taken from the cleanup area. This approach utilizes direct measurements of samples considered to be "representative" of soils in the cleanup area to reasonably estimate concentrations of constituents of concern remaining in soils in the area. In addition, ground water monitoring provides the only means to ensure whether or not ground water quality is being affected by soil contaminants. Therefore, the provisions in Paragraph (k) also clarify that ground water monitoring may be required to evaluate the success of soil cleanup activities.

Paragraph (l), *Remaining Constituents*

The provisions proposed in Paragraph (l) are necessary to be consistent with the regulations set forth in Chapter 15. If the cleanup action is intended to contain waste at the place of release, Section 2511(d) of Chapter 15 provides that Chapter 15 is applicable to the extent feasible. In general, the provisions that apply to a cleanup are portions of Article 2 (Waste Classification), Article 3 (Waste Management Unit Classification), Article 4 (Construction Standards), Article 5 (Monitoring and Corrective Action), and Article 8 (Closure and Post-closure Maintenance). See Memorandum from Craig M. Wilson, Assistant Chief Counsel, State Water Board, to James Cornelius, "Applicability of [Chapter 15] to Remedial Actions at National Priority List Sites," February 2, 1994.

Spills and leaks from unauthorized waste management units and other discharges to the environment typically occur at sites that have not been properly selected with regard to Chapter 15 siting and construction standards. Therefore, in order to meet Chapter 15's performance goals and provide equivalent protection against water quality impairment, the waste must generally be removed from the place of release. However, if the site complies with the construction and prescriptive standards of Chapter 15, or if it is not feasible to remove the waste from the place of release, then in order to comply with the performance goals of Chapter 15, the waste must be contained such that it does not migrate. See Title 23, CCR, Sections 2522, 2540.

Therefore, any action which is not designed to remove the waste must be designed to adequately contain the waste. In this context, to "contain" is to prevent further dissemination of the waste by any means other than the removal of all contaminated materials. Examples of actions which may contain waste include, but are not limited to, in-situ stabilization through chemical fixation, in-situ bioremediation, hydraulic capture of a ground water plume through a pump and treat action, placement of a final cover, placement of slurry walls, and utilization of natural hydraulic conditions or man-made barriers. Furthermore, waste which remains at the place of release at the close of corrective actions (including excavation and removal) must be adequately contained by natural hydrogeologic conditions, man-made barriers, etc., so as to prevent migration.

Potential environmental impacts are discussed following the CEQA checklist (see Appendix 1). In considering economics, it should be noted that there are costs associated with the provisions of this policy. For instance, there are associated costs with the following activities which are required under this policy: investigation of the vertical and horizontal extent of the pollution; removal or containment of the source as well as remediation actions; submission of reports, studies, plans, etc.; verification sampling and ground water monitoring.

Issue 16: Specify process for responding to cleanup cases where water quality objectives may not be technically or economically achievable within a reasonable period of time (Chapter IV - Policy 9, Policy for Designating Ground Water Quality Limited Zones (WQLZs), (pages IV-23 to IV-24)

Present Policy

The existing Basin Plan does not address how the Regional Water Board may respond in cases of anthropogenic (caused by human activities) pollution of ground water where cleanup to levels which comply with all applicable water quality objectives can be adequately demonstrated as not technologically or economically achievable.

Issue Description

In recent years, the Regional Water Board has become increasingly aware that, in limited circumstances, compliance with water quality objectives for ground water as part of cleanup actions cannot reasonably be achieved. There are cases of anthropogenic pollution of ground water, where cleanup to levels which comply with all applicable water quality objectives may not be technologically or economically achievable, even if an aggressive cleanup program, which is adequate to understand both the hydrogeology of the site and pollutant dynamics, has been fully implemented and operated for a reasonable period of time. The existing basin plan, and current policy, do not address these cases.

Alternatives

1. NO ACTION. No procedure would be provided to address cases where it is not reasonably possible to comply with water quality objectives. This may result in dischargers needlessly expending resources in an attempt to achieve the impossible.

2. ALLOW ESTABLISHMENT OF "ALTERNATE POINTS OF COMPLIANCE" IN GROUND WATER. This alternative would set forth a new policy to allow alternate points of compliance in cases where the Regional Water Board determines that compliance with ground water quality objectives is not achievable throughout the body of ground water.

   This alternative would set forth a procedure to address cases where compliance with water quality objectives can be demonstrated as not being achievable throughout the body of ground water. However, this alternative may not adequately address all of these cases. Because the Board would be making an exception to the appropriate location for applying water quality objectives, it would be necessary for the discharger to demonstrate, to the satisfaction of the Board, that restoration of all beneficial uses will not be achievable at any time in the future after the

determination is made. This demonstration could only be based on a high degree of confidence with respect to the lack of future achievability; however, it may be impracticable to make such a demonstration because of potential future technologic advances or alteration of hydrogeologic conditions.

The establishment of alternate points of compliance would, in effect, delete beneficial use designations. This approach would informally de-designate the impacted beneficial uses of waters upgradient of the alternate points of compliance. Therefore, this provision would be inconsistent with the Porter-Cologne Act which requires that beneficial uses be designated in the Basin Plan and protected by the Regional Water Board. See Water Code Sections 13000, 13241. Such an approach would probably be unworkable because an amendment to the Basin Plan's beneficial use designations would be required each time alternate points of compliance were established.

There is also concern that such demonstrations would be inappropriately focused on the "alternate points of compliance" instead of the inability to achieve ground water quality objectives. Providing alternate points of compliance also conveys the impression that objectives have been met when, in fact, the objectives are incapable of being met. Moving the point of compliance outward to the edge of a plume that is resistant to cleanup methods would also incorrectly give the impression that compliance with cleanup requirements based on Regional Water Board regulations, plans, policies has been achieved.

Establishing alternate points of compliance is inconsistent with Resolution No. 92-49, which requires all cleanup and abatement actions to be in conformance with applicable provisions of Chapter 15 to the extent feasible. Article 5 of Chapter 15 includes provisions which describe specific locations for "points of compliance" established to evaluate compliance and corrective actions. Title 23, CCR, Section 2550.5. These points of compliance cannot be moved during cleanup actions at waste management facilities. This alternative would result in inter-program inconsistency.

Because essentially "new" compliance points are established pursuant to this alternative, there is no provision for future attainment of ground water quality objectives upgradient of the new points of compliance. Therefore, this approach appears inconsistent with current policies by creating the impression that restoration of the beneficial uses of the affected ground water resource is no longer a goal.

3. ALLOW ESTABLISHMENT OF WATER QUALITY LIMITED ZONES IN GROUND WATER. This alternative would set forth a new policy to allow the Regional Water Board to respond in cases of anthropogenic (caused by human activities) pollution of ground water where cleanup to levels which comply with all applicable water quality objectives can be adequately demonstrated as not achievable within a

reasonable period of time. The new policy would allow the Regional Water Board to consider designating the portion of the aquifer that is not able to be brought into compliance with objectives as a Water Quality Limited Zone (WQLZ). Conditions which must be met prior to the Regional Water Board designating a WQLZ are set forth in order to ensure adequate protection of remaining unpolluted ground water resources in the Region.

Under this alternative, in cases where the Regional Water Board determines that compliance with ground water quality objectives is not technologically or economically achievable either after a reasonable attempt has been made or after applicable remedial technologies have been fully evaluated, an additional determination could be made by the Board to designate the boundaries of the Water Quality Limited Zone (WQLZ). In most cases, this determination would be based on available data. The boundaries of the WQLZ would be delineated by the portion of the aquifer that is not able to be brought into compliance with applicable water quality objectives. The nature, and vertical and horizontal extent of the plume is required to be defined by the discharger as part of the remedial investigation and remedy evaluation phases, which would already have been completed. Therefore, it is not likely that the discharger would need to gather additional information to define the proposed boundaries of the WQLZ.

If the Board determines that restoration of beneficial uses is not achievable in the foreseeable future, then a formal delisting of one or more beneficial uses, through a Basin Plan amendment, would be an option.

Staff Recommendation

Adopt alternative 3. This alternative is necessary to set forth a reasonable and adequately protective procedure to address cases where either the appropriate performance of an approved cleanup program or the thorough evaluation of applicable remediation technologies demo strates that it is not reasonably possible to comply with applicable water quality objectives. In both cases, the designation of non-compliant waters as a Water Quality Limited Zone (WQLZ) would be appropriate only if best available and economically achievable treatment technology has been properly implemented or are infeasible to implement. As previously discussed under Issue 15, the requirement to use best available and economically achievable treatment technology is set forth as part of the corrective action requirements of Chapter 15, Article 5. Pursuant to Resolution No. 92-49, these requirements are equally applicable to corrective actions in the context of all discharges to land which are subject to Water Code Section 13304.

The proposed policy accounts for two circumstances under which compliance with water quality objectives may be demonstrated to be unachievable. In the first situation, through the proper implementation of best available and economically achievable

treatment technology approved pursuant to the proposed "Policy for Investigation and Cleanup of Contaminated Sites, ground water pollutant concentrations have been demonstrated to reach asymptotic levels which are higher than the most limiting of applicable water quality objectives. Under this alternative, restoration of all beneficial uses must be demonstrated by the discharger, to the satisfaction of the Board, not to be achievable at the present time, i.e., at the time the determination is made. Such demonstrations would be made using data normally developed during implementation of remedial action methods and may not require that additional information be developed. Since such data are necessary to the demonstration, in this case, full implementation of the approved treatment technology is necessary before a WQLZ can be designated.

The Regional Water Board is expressly prohibited under Water Code Section 13360 from specifying methods to be used to attain compliance with Water Board requirements at a particular site. It is therefore the discharger's responsibility to propose and conduct methods that are effective. The Regional Water Board is responsible for establishing the performance standards in the form of cleanup levels. If the cleanup method fails to achieve these standards, the method must be modified accordingly. The conditions specified in the new policy are necessary to ensure that the discharger has made such modifications to "fully"implement the prescribed remediation technology in a good faith effort to comply with applicable water quality objectives.

However, it is reasonable to assume that in some cases it could be demonstrated, to the satisfaction of the Regional Water Board, that it is either technologically or economically infeasible to implement any technology that will achieve compliance with all applicable water quality objectives. In such cases, the proposed policy would also permit the Regional Water Board to designate a WQLZ. Even though it may be infeasible to implement technologies that will achieve compliance with objectives, it may be technologically and economically feasible to implement remediation technologies that will achieve reductions in pollutant levels. The policy would require implementation of such technologies in accordance with existing policies and procedures set forth to achieve "background" or the "highest" water quality as a goal. See Issue 15 above.

In both situations, the new policy further requires the Regional Water Board to ensure that the discharger has implemented adequate source removal and/or isolation to eliminate or significantly reduce the source of ground water pollutants. As previously discussed under Issue 15, removal or containment of the source of contamination is required in order to ensure that water quality is adequately protected from the potential adverse affects of the wastes discharged. This approach to protecting water quality is consistent with Section 2550.10(c) of Chapter 15, which requires the discharger to take source control action as part of corrective action measures. It is essentially impossible to control contaminant migration and ensure the long-term effectiveness of corrective action programs without significant source control or removal.

To promote future attainment of compliance with water quality objectives where possible, periodic evaluation of achievability of further cleanup will be required and the Board will critically limit further discharges of waste to ground water and discharges of waste to land which have the potential to affe ground water quality within WQLZs. These requirements are necessary to be consistent with existing policies and procedures set forth to maintain "background" or the "highest" water quality as a goal.

Additional conditions set forth in the new policy in order to ensure that water quality is adequately protected from the potential adverse affects of the discharged wastes include management of any residual ground water pollution to prevent pollutants from spreading to adjacent unpolluted waters (i.e., maintaining hydraulic control of ground water within the WQLZ), and verification of such control through continued monitoring. Such requirements would be enforced through the adoption, by the Board, of waste discharge requirements or and enforcement order for the WQLZ.

In order to compensate users for present loss of beneficial uses of waters within the WQLZ, the discharger will be required to provide alternative water supply to affected users. This is consistent with Water Code Section 13304 which requires the discharger to "mitigate the effects" of the discharge.

While this alternative acknowledges the impracticability of achieving ground water quality objectives in cases in which it has been demonstrated, it also includes a provision to account for future attainment of these water quality objectives. In the majority of cases it should be assumed that the waters within a WQLZ would be able to meet water quality objectives at some future date, either using newly-developed technology or through the progress of natural attenuative mechanisms. It is necessary to recognize and address these possibilities as part of antidegradation and potential beneficial use protection. This alternative is necessary to be consistent with current policies because the restoration of the affected ground water resource remains a goal.

Potential environmental impacts are discussed following the CEQA checklist (see Appendix 1). In considering economics, it should be noted that there are costs associated with this policy. A discharger responsible for a WQLZ will be required to provide an alternative water supply to affected users, maintain hydraulic control of ground water within the WQLZ, verify such control through continued monitoring, and periodically evaluate the achievability of further cleanup. There may be institutional controls, such as deed restrictions which could affect property values.